The Egyptian Materials Research Society

Academy of Scientific Research and Technology

National Institute for Standards

Eg-MRS 2010

THE XXVII CONFERENCE

Solid State Science and Materials Physics

WORKSHOP

Functional Nanostructures and Hybrid Organic-Inorganic Materials

22th - 25th March 2010

Fayoum, Egypt

THE CONFERENCE IS HELD UNDER THE AUSPICES OF

Prof. Dr. Tarek Hussein

President of
The Egyptian Academy of Sciences

Honorary Chairmanship

Prof. Dr. Raafat K. Wasef

Cairo University

Prof. Dr. Aly Abo El-Ezz

President of National Institute for Standards

International Organizer

Prof. Dr. Mostafa A. El-Sayed

Georgia Tech., Atlanta, USA

Prof. Dr. Hanns-Ulrich Habermeier

Max-Planck-Institut, Stuttgart, Germany

Sponsored by:

- Academy of Scientific Research and Technology, Egypt.
- National Institute for Standards, Egypt.
- Max-Planck-Institute, Stuttgart, Germany.

BOARD

Conference Chairman:

Prof. Dr. Kamal Abd El-Hady **Minia University**

Conference Co-Chairman:

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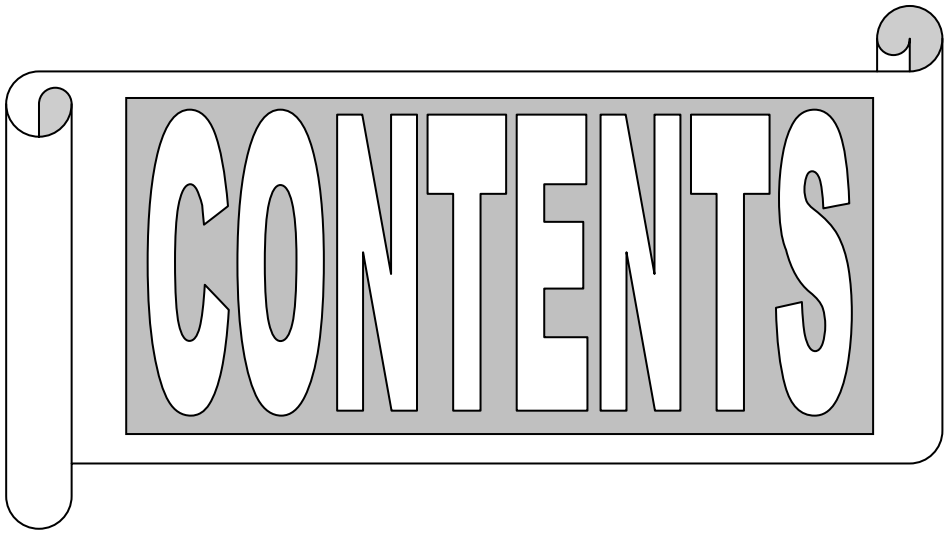

CONTENTS

MAILING ADDRESS

All correspondances should be addressed to:

The Egyptian Materials Research Society (Eg-MRS),
33 Abdel-Khalik Tharwat Street,
Cairo,
Egypt.

Telephone/Fax: +202-23925997
(Sunday & Wednesday, 7-10 pm)

E-mail: contact@egmrs.org

Web: http: //www.egmrs.org

Objectives

CONFERENCE

The aim of the conference is to provide a forum for exchange of knowledge in the high interdisciplinary fields of solid state science and materials physics as well as to bring together scientists working in academic and applied research areas for constructive interactions.

The topics to be covered are:

* Semiconductors and devices.
* Metal and polymer physics.
* Nanostructure materials.
* Optoelectronic materials.
* Materials for energy.
* Magnetism and magneto-optics.
* Crystallography and Amorphography.
* Spectroscopy and optical properties.
* Materials processing and characterization.

WORKSHOP

Research in nanoscience and hybrid materials has experienced considerable growth in recent years with increasing interest from a wide range of industries. Hybrid materials have currently a great impact on numerous future developments including nanotechnology. Hybrid materials can create new products with desirable properties, such as being: durable, high-strength, intelligent, bioactive, biodegradable and lightweight. The lectures include science of nanostructures in novel hybrid configurations of organic/inorganic materials; synthesis, characterization and applications:

- Future of electronics and optoelectronics.
- Nanoscale and hybrid optoelectronic devices.
- Nanosensores and Nanoceramics.
- Zero thermal expansion and nanostructured hybrid crystal.
- Plasmonic (noble metal nanoparticles)
- Nanophotonic devices and biophotonics.
- Biomaterials and biomedical materials.
- Light emitting diodes.

Opening Ceremony

- **Prof. Dr. Tarek Hussain,**
  President for Acadmy of
  Scientific Research & Technology, Egypt.

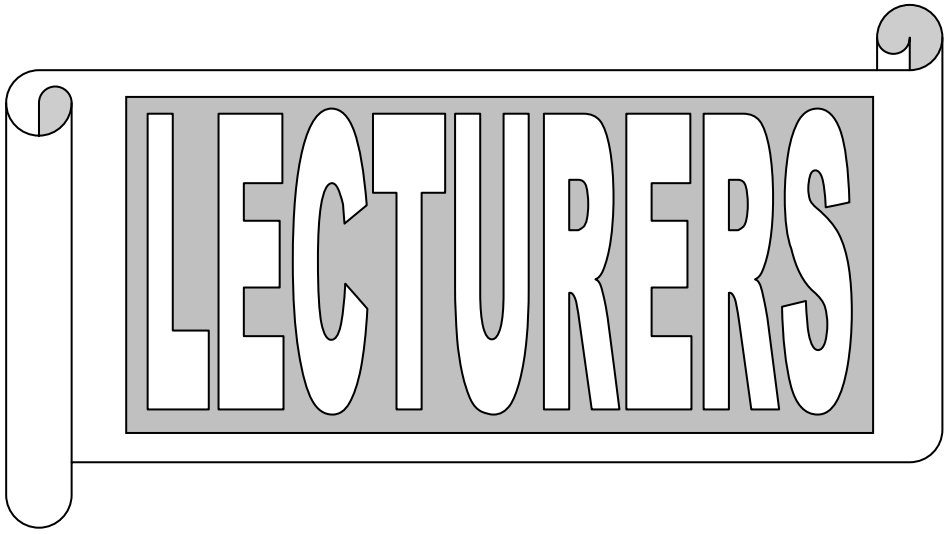
- **Prof. Dr. Raafat K. Wasef**
  Honorary Chairman of Eg-MRS & Conference

- **Prof. Dr. Kamal Abd El-Hady**,
  Chairman of Eg-MRS & Conference.

- **Prof. Dr. Mostafa A. El-Sayed**
  Workshop International Organizer.

- **Prof. Dr. Hanns-Ulrich Habermeier,**
  Workshop International Organizer.

- **Prof. Dr. Hassan Talaat,**
  Chairman of Workshop.


LECTURERS

• Prof. Dr. Ali El Sayed Abou El-Ezz (Ezz)

National Institute for Standards,
Giza,
Egypt.
E-mail: aabuelezz@Yahoo.com /
aabuelezz@nis.sci.eg

Biography

➢ **Present Professional Position:**

2008: Acting President of National Institute for Standards.

➢ **Academic Information:**

1987: Dr. Eng., Applied Mechanics, Division of Eng., Kyushu Univ., Japan.
1981: M. Sc., Design and Production, Mechanical Eng. Dept., Cairo Univ.
1975: B. Sc. Mechanical Eng., Faculty of Eng., Al-Azhar Univ.

➢ **Abroad Scientific Missions:**

2003: Short Term Visit, Faculty of Engineering, Paderborn University, Germany.
1999: Visiting Professor, Institute for Applied Mechanics, Kyushu Univ., Japan.
1995: Visiting Researcher, Institute for Applied Mechanics, Kyushu Univ., Japan.
1994: Short Term Study, National Institute of Science and Technology, Germany.
1991: Workshop in Metrology and Measurement Standards, NRLM, Japan.
1982-1987: Ph.D. Student, Applied Mechanics Div., Faculty of Eng., Kyushu Univ.

➢ **Employment Record:**

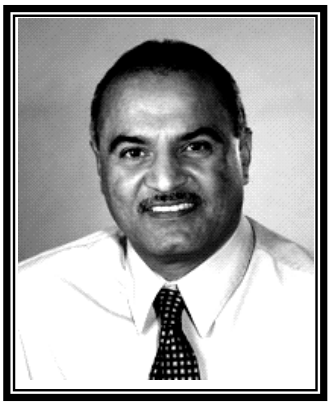
2005 - 2007 Vice President of NIS
2001 –2005: Professor, Dean, High Institute of Engineering, 6th October City, 11/2001- Present. Minstar declare (1639-2001, 1860-2002, 1757-2003, 20-2005).
1999-2001: Vice-Dean Faculty of Eng., October 6 University.
1997- 1999: Mechatronics Departments Head, Faculty of Eng., October 6 University.
1982-1997: Associate Professor, Force & Material Metrology Dept.& Head of Eng. Administration, National Institute for Standard, NIS
1992 – 1987: Researcher, Force Calibration & Material Testing Dept., NIS.
1981 - 1982: Assistant researcher, Force Calibration & Material Testing Dept., NIS.
1977 – 1981: Research assistant, Force Calibration & Material Testing Dept., NIS.
1975 - 1977: Repair & Maintenance, Armed Forces.

➢ **Research Activities, Keywords:**

- Force Calibration and Measurement / Material Testing / Measurement and Instruments.
- Experimental Mechanics / Optical Methods / Laser Application.
- Strength of Material / Stress Analysis / Fracture Mechanics.
- Material science / Engineering Polymer Science / Polymer Crazing.

- **Prof. Dr. Samy El-Shall (Shl)**

Department of Chemistry,
Virginia Commonwealth University
Richmond, VA 23284-2006,
USA.



Biography

➢ **EDUCATION**

Ph.D. (Physical Chemistry) with Distinction - December 1985, Georgetown University
MS (Physical Chemistry) - 1980, Cairo University, Egypt
BS (Chemistry) with Distinction - 1976, Cairo University, Egypt

PROFESSIONAL EXPERIENCE

June 1997 - present : Full Professor, VCU
June 1994 - May 1997: Associate Professor, VCU
Sept. 1989 - May 1994: Assistant Professor, VCU
Jan. 1986 - Aug. 1989: Research Associate, Dept. of Chemistry, UCLA
Mar. 1987 - July 1987: Asst. Professor, Dept. of Chemistry, Cairo Univ.

➢ **RESEARCH INTERESTS**

Nanostructure Materials, Nanotechnology, Photoluminescence of Nanoparticles, Catalysis on Nanoparticles, Molecular Clusters, Gas Phase and Cluster Polymerization, Nucleation Phenomena

➢ **Selected Publications** *(over 160 papers)*

"Microwave Synthesis of Highly Aligned Ultra Narrow Semiconductor Rods and Wires", A. B. Panda, G. Glaspell and M. S. El-Shall, *J. Am. Chem. Soc.* **128**, 2790-2791 (2006).

"Vapor Phase Synthesis of Metallic and Intermetallic Nanoparticles and Nanowires: Magnetic and Catalytic Properties". G. Glaspell, V. Abdelsayed, K. M. Saoud and M. S. El-Shall, *Pure Appl. Chem.*, **78**, 1671-1693 (2006).

″Polymerization of Ionized Acetylene Clusters into Covalent Bonded Ions. Evidence for the Formation of Benzene Radical Cation″, Paul O. Momoh, Samuel A. Abrash, Ridha Mabourki and M. S. El-Shall, *J. Am. Chem. Soc.* **128**, 12408-12409 (2006).

"Catalyzed Radical Polymerization of Styrene Vapor on Nanoparticle Surfaces and the Incorporation of Metal and Metal Oxide Nanoparticles within Polystyrene Polymers", V. Abdelsayed, E. Alsharaeh and M. S. El-Shall, *J. Phys. Chem. B*. 110, 19100-19103 (2006).

"Nanocatalysis on Tailored Shape Supports: Au and Pd Nanoparticles Supported on MgO Nanocubes and ZnO Nanobelts", Garry Glaspell, Hassan M. A. Hassan, Ahmed Elzatahry, Lindsay Fuoco, Nagi R. E. Radwan and M. S. El-Shall, *J. Phys. Chem. B*. **110**, 21387-21393 (2006).

"Vapor Phase Synthesis and Characterization of Bimetallic Alloy and Supported Nanoparticle Catalysts", V. Abdelsayed, K. M. Saoud and M. S. El-Shall, *J. Nanoparticle Research*, **8**, 519-531 (2006).

"Microwave Synthesis of Supporting Au and Pd Nanoparticle Catalysts for CO Oxidation″, G. Glaspell, L. Fuoco and M. S. El-Shall, *J. Phys. Chem. B*. **109**, 17350-16355 (2005).

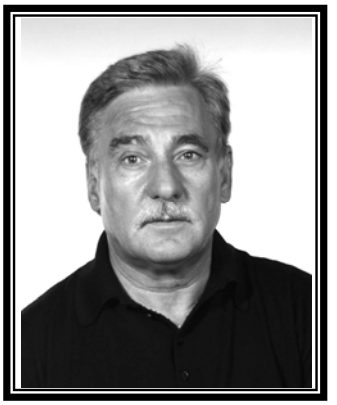
″Direct Evidence for the Gas Phase Thermal Polymerization of Styrene. Determination of the Initiation Mechanism and Structures of the Early Oligomers by Ion Mobility″, E. H. Alsharaeh, Y. M. Ibrahim and M. S. El-Shall, *J. Am. Chem. Soc*. **127**, 6164 (2005).

➢ *US Patents:*

1. "Silica Nanoparticles", M. S. El-Shall, D. Graiver and U. C. Pernisz, *U.S. 5,580,655*
2. "Silicon Nanoparticles", M. S. El-Shall, D. Graiver and U. C. Pernisz, *U.S. 5,695,617*
3. "Nanoparticles of Silicon Oxide Alloys", M. S. El-Shall, D. Graiver, U. C. Pernisz, *U.S. 6,136,156*
4. "Nanocrystalline Intermetallic Powders Made by Laser Evaporation", *U.S. 6,368,406*
5. "Copper and/or Zinc Alloy Nanopowders Made by Laser Vaporization and Condensation", M. S. El-Shall, S. Deevi, Y. B. Pithawalla, S. C.Deevi and A. C. Lilly, Jr., *Approved* (2004)
6. "Palladium-Containing Nanoscale Catalysts*"*, M. S. El-Shall and S. C. Deevi, *Pending* (2005).

- # Prof. Dr. Hanns-Ulrich Habermeier (Hbm)

Max-Planck-Institut für Festkrperforschung,
Heisenbergstr. 1,
D 70569 Stuttgart,
Germany.
Phone: +49-711-689-1372
FAX: +49-711-689-1389
E-mail: huh@fkf.mpg.de



Biography

- **Personal Data**
  Birth: 27.1.1945 in Crailsheim, Württemberg, Germany
  Wife: Ingeborg Habermeier [maiden name Haake], Freelanced Fashion Designer.
- **Education**
  School education:
  1951-1955: Elementary School Crailsheim
  1955-1964: Albert-Schweitzer-Gymnasium, Crailsheim.
  1964:Graduation Abitur.
  Professional Education:
  1970: Graduation Diplomphysiker: Study of Physics at University (TH) Stuttgart, Additional topics: Mathmatics, Chemistry.
  1974: Promotion to Dr. rer. Nat.
  Title of thesis: "Das Eindringfeld und die Magnetisierungskurve von Supraleitern erster Art mit Kristallbaufehlern".
- **Professional Career**
  1971-1974: Reader for Mathematics at Fachhochschule [Junior University] für Technik, Stuttgart.
  1974-1978: Staffmember at Max-Planck-Institut für Metall-forschung, Institut für Physik, Stuttgart and at Institut für Theoretische und Angewandte Physik der Universität Stuttgart.
  1978-1979: Visiting Scientist am IBM Thomas Watson Research Center, Yorktown Heights, NY, U.S.A.

since1980: Head of Scientific Service Group Technology at MPI für Festkörperforschung, Stuttgart.
since 1997: Honorary Professor and Member of Faculty of Yunnan Polytechnic University, Kunming, P.R. Of China.
since 2000: Honorary Professor and Member of Faculty of Kunming University of Science and Technology [KUST] P.R. of China.
since 2004 Deputy Director of the Institute for Advanced Materials for Photoelectronics (IAMPE), Kunming University of Science and Technology [KUST] P.R. of China.

• **Prof. Dr. Nicola Hüsing (Hus)**
Inorganic Chemistry I,
Ulm University,
Albert-Einstein-Allee 11,
89081 Ulm,
Germany.
E-mail: nicola.huesing@uni-ulm.de

Biography

- Nicola Hüsing is Full Professor at the Institute of Inorganic Chemistry at Ulm University.
- She was born in Rheda-Wiedenbrück and studied chemistry at the University of Würzburg. During her dissertation on highly porous inorganic-organic silica aerogels she has been working at the Vienna University of Technology and the University of California/ Los Angeles.
- She received her Ph. D. in 1997 at the University of Würzburg.
- In 1998 she was awarded a post-doctoral fellowship with C. J. Brinker to work on nanostructured thin films.
- Returning to Vienna she finished her habilitation in 2003.
- Started as a full professor at the University of Ulm in 2004.
- In 2005 she was awarded the Donald-Ulrich Award of the International Sol-Gel Society.
- In 2010, Nicola Hüsing will be moving to the University of Salzburg as chair of the Institute of Materials Chemistry.
- She is co-author of a textbook on the Synthesis of Inorganic Materials, as well as author and co-author of about 100 referred publications and 5 patents.
- Her research interests are in the synthesis of sol-gel based porous materials and mesoscopically organized systems, especially with respect to synthesis – structure – property relations.

- **Prof. Dr. Abdel Hadi Kassiba (Kas)**

Laboratoire de Physique de l'Etat Condensé,
Institut de Recherche en Ingénierie Moléculaire et Matériaux Fonctionnels– FR-CNRS 2575,
Faculté des Sciences, Université du Maine,
France
E-mail: kassiba@univ-lemans.fr

Biography

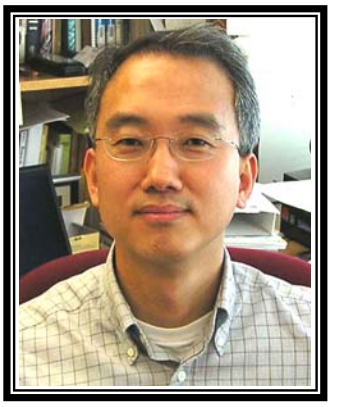
- Abdel Hadi KASSIBA is Professeur in the University of Maine in le Mans – France –
- He is Director of the Physics, Mechanics and Acoustics Department.
- His research group is the Laboratory of Physics of Condensed Matter affiliated to the French National Center of scientific research CNRS.
- Abdelhadi Kassiba was former student of the University of Caen where he obtain PhD degree and in the University of Maine Le Mans where he obtain the Degree of Habilitation for research direction (required qualification for professor positions).
- His main research areas are devoted to Nanomaterials of Silicon Carbide , Nanocomposites for nonlinear optics and electrooptics, Functional mesoscopic materials and EPR Spectroscopy. A.Kassiba have published more than 50 peer review papers , 2 books and give 15 Invited International conferences, 30 Oral presentations in international conferences and ensure several session Chairman International conferenes (Morocco, Poland, Tunisia, Romania, France).
- A. Kassiba has supervised 20 MSC thesis and 5 Phd doctorants.
- A. Kassiba is co-Organisation of Annual Nanoscience School France-Maghreb .

- **Prof. Dr. Guido Kickelbick (Kic)**
  Saarland University,
  Institute of Inorganic Solid State Chemistry
  Am Markt, Zeile 3, 66125 Saarbrücken,
  Germany.
  E-mail: kickelbick@mx.uni-saarland.de

Biography

- He studied chemistry at the University of Würzburg (Germany) and received his PhD in 1993 in the field of inorganic chemistry.
- The topic of his thesis that was conducted under the supervision of Professor Ulrich Schubert was the synthesis and characterization of surface-functionalized metal oxo clusters.
- After finishing his PhD he was awarded a post-doctoral fellowship with Krzysztof Matyjaszewski at the Center for Macromolecular Engineering at the Carnegie Mellon University in Pittsburgh (USA) on the application of controlled radical polymerization in the formation of hybrid materials.
- In 1998, he moved to the Vienna University of Technology (Austria) where he started his own research in the field of hybrid materials and nanocomposites.
- In 2003, he was promoted to an associate professor at the Institute of Materials Chemistry of the Vienna University of Technology.
- In 2009, he accepted a call to a chair in inorganic chemistry of the Saarland University in Saarbrücken (Germany).
- His research interests are located in the field of chemical design of hybrid materials and nanocomposites, surface-functionalized nanoparticles and sol-gel chemistry.
- Guido Kickelbick has published more than 150 scientific papers on different aspects of inorganic, polymer and materials chemistry.
- He is in the editorial board of several scientific journals and a member of the German Chemical Society, Austrian Chemical Society, American Chemical Society, as well as vice president of the International Sol-Gel Society.

- **Dr. Ho-Cheol Kim (Kim)**
  IBM Research Division,
  Almaden Research Center,
  650 Harry Road, San Jose, CA
  USA
  E-mail: hckim@almaden.ibm.com



Biography

- IBM Research Division, Almaden Research Center, 650 Harry Road, San Jose, CA 95120
- Dr. Ho-Cheol Kim is a Research Staff Member in Science and Technology Group at IBM Almaden Research Center.
- Dr. Kim joined IBM Research Division in 2001 right after his post-doctoral research at Polymer Science and Engineering Department at the University of Massachusetts at Amherst.
- He received his B.S., M.S. and Ph. D. degrees from Seoul National University in Korea.
- His research focuses on the creation of nanostructures of functional hybrid materials using polymer self-assembly and their applications to surface nano-patterning, photovoltaics and electrical energy storage.
- He has received IBM Research Division Award in 2005 for advances in creation of controlled nanostructures.
- Dr. Kim has authored or co-authored over 90 research publications, mentored over 35 undergraduate and graduate students and holds 14 issued US patents.

- **Prof. Dr. Ulrich Schubert (Sch)**
  Institute of Materials Chemistry,
  Vienna University of Technology,
  Austria
  E-mail: uschuber@mail.zserv.tuwien.ac.at

Biography

- Born May 26, 1946 in Regensburg, Germany
- Personal homepage:
  http://info.tuwien.ac.at/inorganic/staff/pers_schubert_e.php

Professional Career

1994 - 2014	Full Professor of Inorganic Chemistry, Vienna University of Technology, Austria
1982 - 1994	Professor of Inorganic Chemistry, University of Würzburg (Germany)
1989 - 1994	Several leading positions (head of department, deputy director, provisional director) at Fraunhofer Institute of Silicate Research, Würzburg (Germany)
04-08/1988	Visiting researcher at the University of Southern California, Los Angeles (USA) with Prof. R. Bau
1980 - 1982	Lecturer for Inorganic Chemistry Technical University München (Germany), (Habilitation in Chemistry 13.2.1980)
1974 - 1980	Research and Teaching Assistant, Technical University München (Germany), Institute of Inorganic Chemistry
1975 - 1976	Postdoctoral researcher with Prof. W. S. Johnson, Stanford University (USA)
1972 - 1974	Doctoral work with Prof. Dr. EO. Fischer, Technical University München (Germany). Ph.D. 30.10.1974
1967-1972	University education in chemistry, Diploma degree in Chemistry, Technical University München (Germany)

Visiting professor

1992	Nottingham.
2005 and 2006	Padova
2007	Vilnius
2007-2008	Strasbourg

Awards and Honors

2000	Inorganic Chemistry Chairs at Queen's University of Belfast and at Technical University Graz offered
2000 - 2005	Corresponding member of the Austrian Academy of Sciences
2005	Full member of the Austrian Academy of Sciences
2005	Fellow of the Royal Society of Chemistry
2006	Member of the German Academy of Sciences Leopoldina
2009	Wacker Silicone Award

Professional Activities

1998 - 2000	Vice president of the Austrian Chemical Society
2001 - 2004	President of the Austrian Chemical Society (GÖCh)
2002 - present	Chairman, Austrian National Committee of IUPAC
2004 - present	Member of the Senate, Christian-Doppler Research Society (CDG), Wien
2004 - present	Member of the scientific advisory board for the doctoral school in molecular sciences, University of Padova
2005 - present	Member of the executive board, Austrian Science Funds (FWF)
1997 - 2003	Speaker of the Austrian priority program "Silicon Chemistry"
1997 - 2005	Austrian member of the management committees COST 518 (and working group leader), COST 523, and COST D19
1997- present	Member of the working committee *Applied inorganic chemistry* of DECHEMA (Frankfurt); chairman since 2003
2007 - present	Member of the scientific advisory board of ERA-Chemistry

- **Dr. Ahmed N. Tantawy (Tan)**
  Executive Director,
  Egypt Nanotechnology Center
  Smart Village, Bulding 121,
  Cairo-Alexandria Desert Road,
  Egypt 12577
  Email: ahmed.tantawy@egnc.gov.eg

Biography

- Dr. Ahmed N. Tantawy is currently Director of Egypt's National Nanotechnology Initiative. His mission is to establish a sustainable ecosystem that would enable the country to accelerate its economic growth through the advancement and use of that emerging technology.
- Until October 2009, Dr. Tantawy was Chief Technical Officer of IBM in the Growth Markets region, where he provided technical oversight for a number of novel and complex projects in Africa, Asia, Australia, Central & Eastern Europe, and Latin America.
- As Technical Director of IBM in the Middle East and North Africa from 2000 to 2008, he championed numerous initiatives, particularly the establishment of the IBM Technology Development Center in Cairo, Egypt. There, he built a team of 500 engineers and scientists and led them to produce over 25 inventions per year while developing products and applications for various IBM divisions and customers on all continents. The center was one of the very few in the world that have achieved CMMI Level 5 certification.
- From 1998 to 2000, Dr. Tantawy was the Director of Advanced Technology Development in IBM's Software Group in the USA. Among other activities, he managed the invention and development of secure management and distribution techniques for electronic media assets over the Internet and digital broadcast networks, with proper content protection and digital rights management.
- As Worldwide Director of Digital Video Technology in 1996 and 1997, he had responsibility for the development of IBM hardware and software products and solutions for various digital media applications.

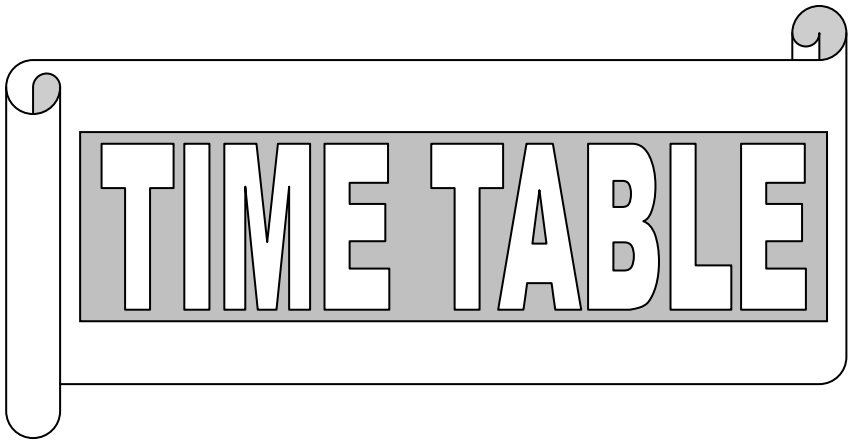
- From 1988 to 1995, he was a Research Scientist then Manager of the Multimedia Communication Systems department at the IBM Thomas J. Watson Research Center in Yorktown Heights, New York. There, he initiated and led several projects in the areas of high bandwidth networks, interactive multimedia systems, autonomous decentralized systems, and high performance workstations.
- Between 1980 and 1988, Dr. Tantawy was a University Professor and an independent consultant in the USA, France, and the Middle East. He led several funded research projects in the areas of Factory Automation, National Health Information Infrastructure, and Satellite Data Networks. He also played a significant role in the establishment of the first College of Computing in Saudi Arabia.
- His scientific contributions include 18 issued patents, 4 books and over 100 refereed papers. He serves on the Board of Trustees and Advisory Boards of a number of universities and research institutes in the USA, Europe, and the Middle East. He had special assignments with the US National Academy of Sciences, the National Science Foundation, and the National Institute of Standards and Technology. He also served as Editor-in-Chief of a book series on High Performance Computing and Communications, Editor of 4 scientific journals, and General Chair of 14 international conferences.
- Dr. Tantawy received his Ph.D. in Computer Engineering with highest honors in 1980 from Grenoble, France. Alexandria University, Egypt, granted him the B.Eng. and M.S. degrees in Electrical and Computer Engineering with distinction and highest honors in 1973 and 1976, respectively.

- **Prof. Dr. Fahrettin Yakuphanoglu (Yak)**
  Physics Department,
  Firat University,
  Elazığ,
  Turkey
  E-mail: fyhan@hotmail.com

Biography

- Master degree in Solid State Physics, Firat University, Elazığ, Turkey, 1996–1998,
- PhD from Solid State Physics, Firat University, Elazığ, Turkey, 1998–2002.
- Assoc. Prof. in Solid State Physics, Firat University, Elazığ, Turkey, 2004.

  The achievements are:
- Organic electronics; (i) organic semiconductors (polymers, monomers, organic compounds): (ii) organic electronic devices such as Schottky diode, P–N heterojunction diode, metal–insulator–semiconductor junctions, solar cells, thin film transistor, photodiode, optical sensor.
- Optical materials based organic and inorganic materials
- liquid crystals and electro-optical properties.
- nanostructure semiconductor materials and their electronic devices applications.

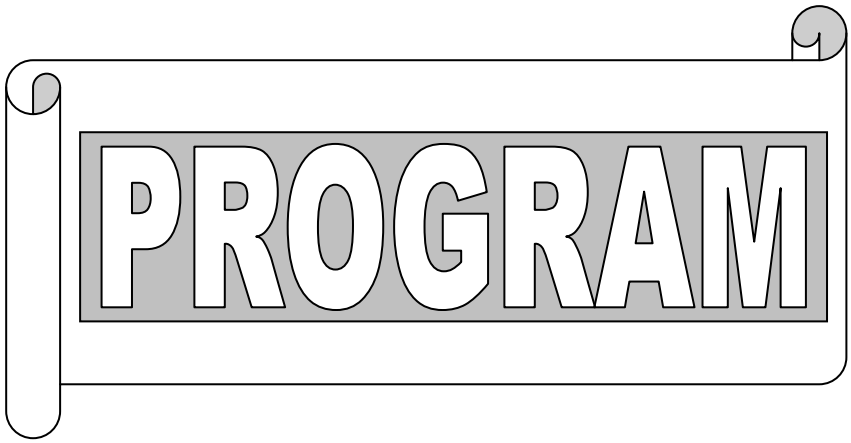

TIME TABLE

Time Table

<table>
<tr><th></th><th colspan="12">09:00 | 10:00 | 11:00 | 12:00 | 13:00 | 14:00 | 15:00 | 16:00 | 17:00 | 18:00 | 19:00 | 20:00</th></tr>
<tr><td>Monday March 22</td><td>Departure to NIS *</td><td>Registration</td><td>Opening Ceremony</td><td colspan="2">LO1 (Ezz)</td><td>LO2 (Hbm)</td><td>Lab Visits & Lunch</td><td colspan="2">To Fayoum Accommodation</td><td rowspan="3">Break</td><td>Paper Session (A)</td><td rowspan="3">Dinner</td></tr>
<tr><td>Tuesday March 23</td><td>LW1 (Kic1)</td><td colspan="2">LW2 (Hus1)</td><td rowspan="2">Break</td><td>LW3 (Sch1)</td><td>LW4 (Kas1)</td><td rowspan="2">Lunch</td><td>LW5 (Kim)</td><td>EGNC (Tan)</td><td>Paper Session (B)</td></tr>
<tr><td>Wednesday March 24</td><td>LW6 (Hus2)</td><td colspan="2">LW7 (Yak1)</td><td>LW8 (Hbm)</td><td>LW9 (Kic2)</td><td>LW10 (Kas2)</td><td>LW11 (Sch2)</td><td>Paper Session (C)</td></tr>
<tr><td>Thursday March 25</td><td>LW12 (Yak2)</td><td colspan="2">LW13 (Shl)</td><td>Closing Ceremony</td><td>Check-out</td><td colspan="7">Excursion & Departure to Cairo</td></tr>
</table>

- Departure to National Institute for Standards:
  08:00 - Nasr City
  08:30 - Tahrir Sq.

Breakfast will be served from 07:00 to 08:30
Poster Session (I): *Tuesday* March 23: 11:00 – 19:30
Poster Session (II): *Wednesday* March 24: 11:00 – 19:30


PROGRAM

Monday, 22th March

10.00 – 10.30: **Registration**
10.30 – 11.00: **Opening Ceremony**
11.00 – 12.00: **(LO1)** " QIS and NIS Role ",
Ali El Sayed Abou El Ezz (Ezz)
12.00 – 13.00: **(LO2)** "Nanostructures in Solid State Sciences",
Hanns-Ulrich Habermeier (Hbm)
13:-0 – 15:30: Visits of NIS Labs and Lunch
18.00 – 20.00: Paper Session (A)

Tuesday, 23th March

09.00 –10.00: (LW1) "Introduction to Inorganic-Organic Hybrid Materials",
Guido Kickelbick (Kic)
10.00 -11.00: (LW2) "Hybrid Inorganic-Organic Porous Materials: Part I",
Nicola Hüsing (Hus)

11.30 – 12.30: (LW3) "Molecular Precursors for Sol-Gel Hybrid Materials: Fundamentals",
Ulrich Schubert (Sch)
12.30 – 13.30: (LW4) "Silicon Carbide Based Hybrid Nanocomposites : Optical and Electronic Features",
Abdel-Hadi Kassiba (Kas)

15.30 – 16.30: (LW5) "Functional Nanomaterials from Polymer Self-Assembly",
Ho-Cheol Kim (Kim)
15.30– 16.30: (EGNC)**:** "The Business of Scientific Research"**,**
Ahmed N. Tantawy (Tan)
18.00 – 20.00: Paper Session (B)

Wednesday, 24th March

09.00 –10.00: (LW6) "Hybrid Inorganic-Organic Porous Materials: Part II",
Nicola Hüsing (Hus)

10.00 -11.00: (LW7) "Organic Electronic Devices",
Fahrettin Yakuphanoglu (Yak)

11.30 – 12.30: (LW8) "Oxide Interface Engineering - a Route towards Superconductivity?",
Hanns-Ulrich Habermeier (Hbm)

12.30 – 13.30: (LW9) "Tailoring the Interface between Inorganic and Organic Components in Hybrid Materials and Nanocomposites",
Guido Kickelbick (Kic)

15.30 – 16.30: (LW10) "Mesoporous Silica Functionalised by Cyclam-Metal Complexes"
Abdel-Hadi Kassiba (Kas)

16.30 – 17.30: (LW11): "Progress in Inorganic-Organic Hybrid Materials by New Precursor Concepts",
Ulrich Schubert (Sch)

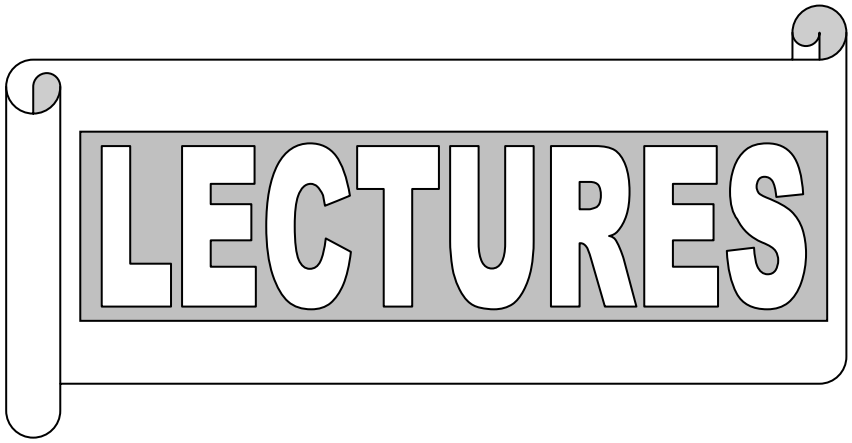
18.00 –20.00: Paper Session (C)

Thursday, 25th March

09.00 – 10.00: (LW12) "Organic thin film transistors",
Fahrettin Yakuphanoglu (Yak)

09.00 – 10.00: (LW13) "The Rise of Graphene: Synthesis, Properties and Novel Applications".
M. Samy El-Shall (Shl)

10.00-10.30: **Closing Ceremony**


LECTURES

LO1

QIS and NIS Role

Ali El-Sayed Abu El-Ezz

National Institute for Standards, Cairo, Egypt

The National Institute of Standards, NIS was established in 1963 just after Egypt became signatory to the Meter Conversion. The main task of NIS is to assure adequate metrological support for the measurement, metrological Infrastructure and technological activities in Egypt. NIS is thus responsible for operation of the Egyptian measurement system linked to the international system of units (SI) with an ultimate goal of international recognition of the Egyptian measurement standards and the calibration certificates issued by NIS laboratories. NIS is the top level of the hierarchal pyramids of the National Measurement System in the country under the umbrella of BIPM.

LO2

Nanostructures in Solid State Sciences

H.-U. Habermeier

Max-Planck- Institutute for Solid State Research
Heisenbergstr. 1 D 70569 Stuttgart, Germany

Currently there is an increasing activity in solid state sciences dealing with effects occurring in systems at nanoscale dimensions. In this review the fundamental changes will be covered if a material is changed from a 3-dimensional to a 2-d, 1-d and 0-d one. Nanophysics and nanochemistry are new disciplines with a bright perspective in basic research and offer novel possibilities in designing materials properties.

In this talk several examples will be highlighted as case studies:

1. Semiconductor interfaces giving rise to a 2D electron gas as a base for the quantum Hall effect and applications in semiconductor lasers.
2. Nanochemistry at interfaces in ionic crystals.
3. Optimizing the figure of merit in thermoelectricity by tailoring structures at the nanoscale.
4. Novel phenomena at complex oxide interfaces.

These rather arbitrarily chosen examples will give a flavor of the possibilities buried in nanoscale sciences and touch upon the next level of sophistication in interfacing solid state nanosciences with the world of organic materials.

LW1

Introduction to Inorganic-Organic Hybrid Materials

Guido Kickelbick

Saarland University, Institute of Inorganic Solid State Chemistry
Am Markt, Zeile 3, 66125 Saarbrücken, Germany

Inorganic-organic hybrid materials represent an emerging class of substances that show unique properties based on the mixing of the two components on the molecular scale. The final material properties arise from an intelligent combination of different functions in one material. Due to their unique building block approach these materials can fulfil many different technological requirements.

The lecture will give an introduction into the field with a focus on various building blocks and the resulting material properties. The talk will particularly cover sol-gel related materials.

LW2

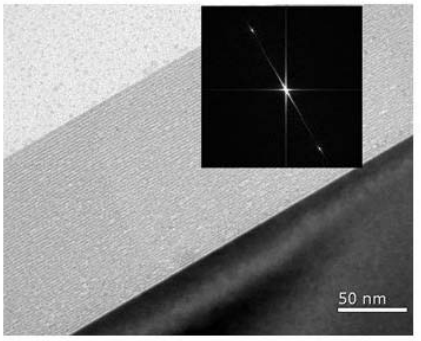
Hybrid Inorganic-Organic Porous Materials: Part I

Nicola Hüsing

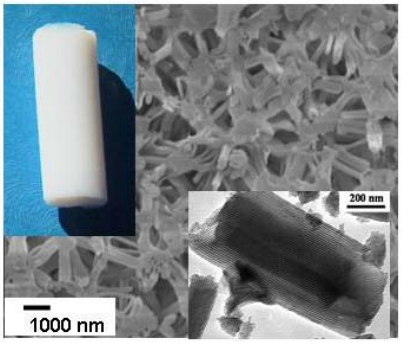
Inorganic Chemistry I, Ulm University
Albert-Einstein-Allee 11, 89081 Ulm, Germany

Sol-gel chemistry is a versatile tool in the formation of inorganic as well as inorganic-organic hybrid materials. Controlled hydrolysis and condensation reactions of (organo)alkoxysilanes allow the combination and even deliberate positioning of organic entities in an inorganic network on the nanometer level. However, not only the chemical composition, but also the structure of the final material is easily controlled on different length scales from the nanometer level up to the macroscopic morphology.

After a short introduction into some general aspects of porous materials, this presentation will give an overview over the huge variety of different porous and nanostructured hybrid silica-based materials that are accessible with a high degree of control by simple sol-gel processing of alkoxysilanes. Thus, the focus of the presentation will lie on wet chemical approaches towards porous hybrid materials, however since drying is always a crucial issue for mesoporous materials, the different variations and possibilities will also be presented in greater detail.



Film



Monolith

Monoliths exhibiting three hierarchical levels

LW3

Molecular Precursors for Sol-Gel Hybrid Materials: Fundamentals

Ulrich Schubert

Institute of Materials Chemistry, Vienna University of Technology

A common type of inorganic-organic hybrid materials is prepared by sol-gel processing of metal or semi-metal alkoxide mixtures. For materials with covalent bonds between the organic constituents and the inorganic structures, organically modified precursors are required which constitute the connecting points in the final material. [1] Organo-trialkoxysilanes $R'Si(OR)_3$, where the organic groups R' are covalently bonded the silicon atoms, are well established for silica-based hybrid materials. Approaches for the preparation and modification of such silanes will be discussed, as well as the initial chemical steps in hydrolysis and condensation reactions. Modification of metal alkoxides, such as alkoxides of aluminum, titanium, zirconium, vanadium, etc., is less straightforward, because metal-carbon bonds are not hydrolytically stable. Bonding of the organic groups is achieved by means of chelating or bridging ligands, such as ß-diketonates, carboxylates, aminoalcoholates, etc.[2] Contrary to organo-trialkoxysilanes, the organically modified metal alkoxides are coordination compounds and therefore coordination equilibria, ligand exchange reactions, oligomerization processes etc. play an important role.

Review articles:

[1] U. Schubert, N. Hüsing, A. Lorenz, *Chem. Mater*. **7**, 2010-2027 (1995).

[2] U. Schubert, *Acc. Chem. Res*. **40**, 730-737 (2007).

LW4

Silicon Carbide Based Hybrid nanocomposites: Optical and Electronic Features

Abdel-Hadi Kassiba

Laboratoire de Physique de l'Etat Condensé- UMR CNRS 6087
Institut de Recherche en Ingénierie Moléculaire et Matériaux Fonctionnels – FR-CNRS 2575
Faculté des Sciences – Université du Maine F-72085 Le Mans cedex 9/ France

The talk will be dedicated to some relevant properties of silicon carbide nanoparticles as isolated objects or associated with polymer or inorganic matrices to realize functional materials for optics, electronics or electro-optics. An overview of the different nano-SiC based composite architectures and relevant properties will be outlined [1-8]. The presentation will focus also on two main architectures including the guest-host nanocomposites which show interesting electro-optical potentialities and core-shell structures which combine inorganic nanoparticles surrounded by thin layer of conducting doped polymer. The features of the electronic transport are compared and discussed between the bare conducting polymers and the core-shell nanocomposites.

References:

[1] J. Bouclé, A. Kassiba, M. Makowska-Janusik, *et al*. *Phys. Rev*. *B*.**74,** 205417 (2006).
[2] S. Charpentier, A. Kassiba, A. Bulou, M. Monthioux, M. Cauchetier, *Eur. Phy. J: Appl. Phy*. **8**, 111 (1999).
[3] A. Kassiba, M. Makowska-Janusik, J. Bouclé, *et al. Phys. Rev. B*. **66** (15), 155311 (2002).
[4] M Makowska-Janusik and A Kassiba, J Bouclé, *et al*. *J. Phys. Cond.Mat.* **17,** 5101 (2005).
[5] A. Kassiba, M. Tabellout, S. Charpentier, N. Herlin-Boime and J. R. Emery *Solid.Stat.Com*. **115**, 389 (2000).

[6] M. Tabellout, A. Kassiba, S. Tkaczyk, L. Laskowski, J. Swiatek *J. Phys.Cond.Mat.* **18**, 1143 (2006).
[7] A. Kassiba in «*Nanostructured Silicon Based Powders and Composites*»- Francis & Taylor (GB) – 2002.
[8] A. Kassiba , W. Bednarski and A. Pud *et al. J. Phys.Chem. C* 111 (2007)

LW5

Functional Nanomaterials from Polymer Self-Assembly

Ho-Cheol Kim

IBM Research Division, Almaden Research Center,
650 Harry Road, San Jose, CA 95120, USA

Controlled architecture in nanoscales is known to be a key factor that governs the functionality of materials. Self-assembly, which is a major structural building route of biomaterials, has been studied extensively as an effective route to nanoarchitectured synthetic materials. In particular, self-assembled organicinorganic hybrid materials where the nanoscopic structures of inorganic materials are directed by organic components have been successfully utilized for creating materials with desired functionality. In this talk, hybrid materials containing block copolymers as a structure-directing material will be discussed with focus on organosilicates, titania and carbon materials. Control of structures, structural characterization and functionality of the hybrid materials will be discussed along with practical applications enabled by these functional nanomaterials such as electronics and energy applications.

LW6

Hybrid Inorganic-Organic Porous Materials: Part II

Nicola Hüsing

Inorganic Chemistry I, Ulm University
Albert-Einstein-Allee 11, 89081 Ulm, Germany

In a follow up on the previous presentation, here an overview over advanced processing possibilities towards thin porous films, particles, monoliths will be given. Since many interesting materials have been developed by this approach, the focus will lie on different strategies developed in our group to innovative multifunctional materials ranging from the application of novel precursor molecules, co-condensation reactions of different alkoxysilanes, post-synthetic modifications of preformed porous bodies, sol-gel processing in the presence of soft and hard templates.

One example discussed in more detail will be the synthesis of the so-called PMO (periodic mesoporous organosilica) materials by the application of bridged silane precursors. The different precursor molecules as well as the variations in the final material will be presented.
In addition, the approach presented for silica-based materials can be extended towards other oxides, e.g. titania, as discussed in this presentation. Nanocomposite materials can be an ideal starting point for inorganic materials applied as electrodes in Li-ion batteries or for catalytic applications.

LW7

Organic Electronic Devices

Fahrettin Yakuphanoglu

Physics Department, Firat University, Elazığ, Turkey

Organic semiconductors have obtained considerable interest in the fields of electronic and photonic devices in the last years due to the possibility of producing large areas devices and the possibility of the optoelectronic features of these materials. These materials have a wide application in the electronic technology, such as Schottky diodes, solar cell, field effect transistor, light emitting diodes etc. It has been observed in recent years that blends of organic semiconductors have been used in fabrication of electronic devices. After a long time, the applications of organic semiconductor devices can be turned from dream to reality. Organic light-emitting devices are commercially available, but organic thin-film transistors and organic solar cells are still in progress.

In this talk I will discuss the electronic properties of organic materials for their electronic device applications such as organic light emitting diodes, organic solar cells and organic thin film transistors.

LW8

Oxide Interface Engineering - a Route towards Superconductivity?

H.-U. Habermeier

Max-Planck- Institutute for Solid State Research
Heisenbergstr. 1 D 70569 Stuttgart, Germany

Oxide Interface Engineering - a Route towards Superconductivity? Recent theoretical considerations suggest that orbital engineering of the electronic structure of spin one-half transition metal based oxides can open new perspectives for high-T_c superconductivity [1,2]. We focus on the nickelate system and report technological prerequisites to prepare nickelate-based oxide interfaces. The basis of this approach is seen in our previous work on ferromagnet-superconducting oxide superlattices where the electronic properties of the system is explained by a combination of charge transfer and modifications of the orbital occupancy at the interface [3,4]. We prepared $LaNiO_3/LaAlO_3$ heterostructures of various compositions and explored their properties with emphasis on structure and interface related defects. Defect chemistry at interfaces will be introduced as new concept for a better understanding of the interface properties and several related problems will be discussed as a path for further progress in achieving interface superconductivity in complex oxide heterostructures.

[1] J. Chaloupka and G. Khaliullin, *PRL* **100**, 016404 (2008).
[2] P. Hansmann *et al. arXiv*: 0807.0408.
[3] J. Chakhalian *et al. Nature Physics* **2**, 244 (2006).
[4] J. Chakhalian *et al. Science* **318**, 1114 (2007).

LW9

Tailoring the Interface between Inorganic and Organic Components in Hybrid Materials and Nanocomposites

Guido Kickelbick

Saarland University, Institute of Inorganic Solid State Chemistry
Am Markt, Zeile 3, 66125 Saarbrücken, Germany

Hybrid materials and nanocomposites are both compounds that are determined by the interface between inorganic and organic components. For many device applications it is necessary to obtain an excellent chemical control of this interface. The final materials properties, such as mechanical, optical, or electronic properties, can change dramatically depending on the boundary conditions between the moieties.
Chemistry provides a variety of methods for the surface-functionalization of inorganic building blocks in such materials. Beside metal nanoparticles and quantum dots the compatibilization between inorganic oxide particles and organic polymers is an important topic in the synthesis of many hybrid materials and nanocomposites. Several strategies can be used for this purpose, either coupling agents are attached to modify the particles surface directly before incorporation into the polymer, or the polymer itself presents groups that allow an interaction with the particle surface. Particularly the surface-functionalization with coupling agents allows an excellent interface design. Introducing different chemical groups the nanoparticles can change their dispersibility in an organic matrix dramatically. Furthermore, the attached groups can establish novel materials properties by an intelligent coupling of the molecular shell with the inorganic core, e.g. energy transfer from light sources.
Recent studies also show that it is possible not only to prepare isotropic surface-functionalizations, but also to attach different molecules to two sites of the inorganic particles, which generates so called Janus nanoparticles. The latter open a wide field of novel applications.

LW10

Mesoporous Silica Functionalised by Cyclam-Metal Complexes

Abdel Hadi Kassiba [1], Malgorzata Makowska-Janusik [2], Nicolas Errien [1] and Ahmad Mehdi [3]

[1] Laboratoire de Physique de l'Etat Condensé LPEC, UMR CNRS n° 6087, Institut de Recherche en Ingénierie Moléculaire et Matériaux Fonctionnels IRIM2F, FR CNRS n° 2575 Université du Maine Avenue Olivier Messiaen 72085 - Le Mans Cedex 9 FRANCE.
[2] Institute of Physics, Jan Dlugosz University, Al. Armii Krajowej 13/15, 42-200 Czestochowa, POLAND
[3] Institute Charles Gerhardt, UMR 5253 Chimie Moléculaire et Organisation du Solide, CC 1701 Université Montpellier II Place E. Bataillon, F-34095 Montpellier Cedex 5, FRANCE.

Mesoporous materials are attractive architectures, with regard to a wide possibility of functionalization by active molecular groups or nanoparticles for potential applications. In this thematic, physicists, chemists, numerical modelling specialists can conjugate their efforts to draw functional materials in wide area from catalysis, drug delivery to other sensing technologies. Also, several strategies of the synthesis routes were developed to obtain notably the well known SBA-15 mesoporous silica with variable pore size ranging from 2 nm-50 nm. The diameter of the pores is a main requirement for their selective functionalization by suitable active groups such as the tetraazamacrocycles which attract a great interest, owing to their ability to form complexes with a wide range of metal ions. The macrocycle complexes present distinctive properties that are not observed with noncyclic ligands. This is the case of 1, 4, 8, 11-tetraazacyclotetradecane (cyclam) groups which are able to chelate metal transition ions and to be grafted in mesoporous SBA-15 matrices. Such approaches lead to original architectures with promising applications in magnetism, optics or combined magneto-optical activity.

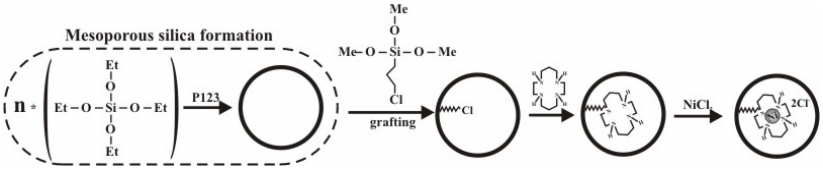


Figure: formation of mesoporous silica functionalized by cyclam-metal groups

In presented work, mesoporous silica matrices functionalized by cyclam molecules chelating nickel and copper ions were realized and investigated by several spectroscopic methods (see figure). Optical and vibrational properties as well as the EPR spectra features of the active organometallic complexes were analysed as a function of their location both in the pores and in the network of the mesoporous silica [1, 2]. The obtained EPR parameters give relevant insights related to electronic, magnetic and structural properties of cyclam derivatives. EPR spectra intensities and line-widths investigated at different temperatures, clarify the environment of the metallic ions. The clustering of active molecules or alternatively their distribution in the mesoporous silica was characterized by Raman, IR and UV-VIS absorption measurements. As support of the performed experiments, theoretical modelling and numerical simulations, applying Density Functional Theory (DFT) methods, were carried out to clarify the functionalisation and its correct achievement in the mesoporous structures.

References:

- A. Kassiba, M. Makowska-Janusik, J. Alauzun, W. Kafrouni, A. Mehdi, C. Reyé, R. J. Corriu and A. Gibaud, *Journal of Physics and Chemistry of Solids*, **67** (4), 875 (2006).
- L. Laskowski, A. Kassiba, M. Makowska-Janusik, A. Mehdi, A. Gibaud, N. Errien and J. Swiatek *Journal of Physics - Condensed Matter*, **21** (7), 76004 (2009).

LW11

Progress in Inorganic-Organic Hybrid Materials by New Precursor Concepts

Ulrich Schubert

Institute of Materials Chemistry, Vienna University of Technology

New precursor types are required for the preparation of the next generation of inorganic-organic hybrid materials, especially those composed from multiple molecular building blocks. Several strategies for the preparation and processing of new precursor types will be discussed: (i) Development of metal alkoxides with organofunctional substituents to extend the chemical base of sol-gel hybrid materials. This requires connecting of functional organic groups to metal alkoxide moieties by means of a chelating or bridging group which does not interfere with the organic functionality.[3] (ii) Use of pre-formed inorganic modules. The conceptionally simplest case is bimetallic precursors in which two metal alkoxide moieties are connected by a hydrolytically stable organic linker.[4] (iii) More complex modules are cage compounds which can be prepared by sol-gel related processes and can be equipped with functional organic ligands.[5] The syntheses and structures of the new precursors will be discussed as well as the hybrid materials prepared thereof.

Review articles:
1 U. Schubert, *Acc. Chem. Res*. 40, 730-737 (2007).
2 U.Schubert, *Polymer Int*. 58, 317-322 (2009).
3 U. Schubert, *Chem. Mater*. 13, 3487-3494 (2001).

LW12

Organic thin film transistors

Fahrettin Yakuphanoglu

Physics Department, Firat University, Elazığ, Turkey

Organic field-effect thin film transistors (OFETs) have widely been investigated due to low-cost and simple processes on various substrates that provide flexible electrical devices. The performances of OFETs have been significantly developed to fabricate low-cost, large-area electronic devices. The organic materials such as thiophene derivates; phenylene vinylene derivatives; pentacene; and metal-phthalocyanine have been used as active layers in organic TFTs. OFETs have exhibited good electrical performances rivalling those of amorphous silicon TFTs. This talk gives an overview of organic thin film transistors based polymers and small molecule semiconductors.

LW13

Size- and Shape-Controlled Nanoparticles, Nanoalloys and Polymer Nanocomposites

M. Samy El-Shall

Department of Chemistry, Virginia Commonwealth University
Richmond, VA 23284-2006, USA

Graphene, a single hexagonally flat layer of graphite, has attracted great interest both for a fundamental understanding of its unique structural and electronic properties and for important potential applications in nanoelectronics and devices. The combination of highest mobility, thermal, chemical and mechanical stability with the high surface area offers many interesting applications in a wide range of fields including heterogeneous catalysis where metallic and bimetallic nanoparticle catalysts can be efficiently dispersed on the graphene sheets.

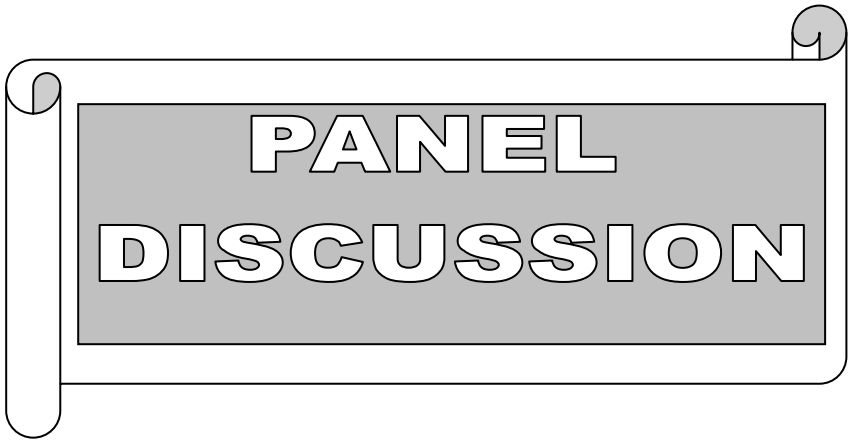
We have developed a facile and scalable chemical reduction method assisted by microwave irradiation[1] for the synthesis of chemically converted graphene sheets and metal nanoparticles dispersed on the graphene sheets.[2] In this talk we will present another novel method for the synthesis of graphene from graphite oxide by a fast laser irradiation process that does not involve the use chemical reducing agents and allows the production of high quality graphene for many applications in electronics, devices and catalyst support.

We will also present several examples of nanocatalysis involving metallic and bimetallic supported nanoparticle catalysts.[2,3] However, the most interesting study involves the use of a palladium/graphene (Pd/G) nanocatalyst for the synthesis of complex organic molecules using the Suzuki, Heck and Sonogashira coupling reactions. These reactions have typically been performed under homogeneous conditions to enhance the catalytic activity and selectivity for specific reactions. However, the issues associated with homogeneous catalysis remain a challenge to the broader application of these synthetic tools due to the lack of recyclability and potential contamination from residual metal in the reaction product.

Our results demonstrate, for the first time, that the Pd/G is a highly active catalyst for the Suzuki, Heck and Sonogashira C-C coupling reactions. This highly catalytic activity is accompanied by an unusual recyclability of the catalyst over seven times with essentially no drop of activity and a reaction that achieves 100% yield. Reasons for the exceptional activity and stability of the Pd/G catalyst will be discussed.

References

1. V. Abdelsayed, A. Aljarash and M. S. El-Shall, *Chem. Mater.***, 21**, 2825-2834 (2009)**.**
2. M. S. El-Shall, V. Abdelsayed, A. S. Khder, H. M. A. Hassan, H. M. El-Kaderi and T. Reich, *J. Mater. Chem*., **19**, 7625-7631 (2009).
3. H. M. A. Hassan, V. Abdelsayed, A. S. Khder, K. M. AbouZeid, J. Terner and M. S. El-Shall, *J. Mater. Chem.*, **19,** 3832-3837 (2009**).**


PANEL
DISCUSSION

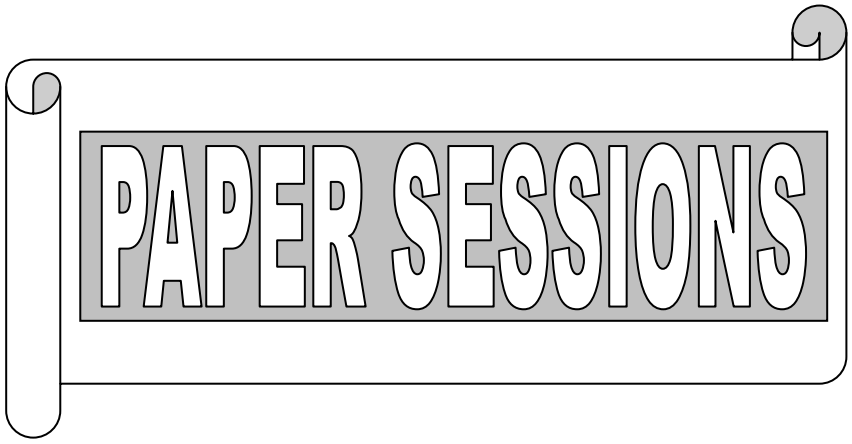
EGNC

The Business of Scientific Research

Ahmed N. Tantawy

Egypt Nanotechnology Centre Smart Village, Bulding 121,
Cairo-Alexandria Desert Road, Egypt 12577

This presentation highlights a model for managing scientific research in a way that satisfies two seemingly contradicting needs: the freedom of research on one hand and the demand for economic impact of scientific results on the other. A combination of some philosophical and empirical approaches can be carefully used to design such a model. One cannot prove however that the outcome is the optimal one because a few such outcomes can arguably lead to similar results due to the uncertainty and complexity of the underlying assumptions. As soon as this task is nearly accomplished, the next problem presents itself: how could one go about the execution of the model? The answer that experience taught us is that the best way to do so is to ensure the constant yet delicate oscillation between the extremes. That cyclic emphasis on basic science then applications and back ensures the perpetual vitality of the research team. A scientist needs not only freedom but also a force that tantalizes his/her curiosity. The latter is achieved through exposure to real life problems that seem intriguing but simple at first, only to prove hard and challenging under deeper examination. The formation of a national nanotechnology center in Egypt provides a good source for examples that help illustrate this methodology and argue for a different, hopefully successful, model for the management of large scale research in a sustainable manner.


PAPER SESSIONS

Paper Session (A)

Monday, 22th March, 2010
(18:00-19:30)

Chairmen

Prof. Dr. Hanns-Ulrich Habermeier
Prof. Dr. Nicola Hüsing

PO(A)-1

The Role of Magnetic Dimensionality on LCMO/YBCO Superlattices

Soltan Soltan

Max-Planck-Institut fuer Festkoerperforschung, Heisenbergstr, Stuttgart, Germany
Physics Department, Faculty of Science, Helwan University, Cairo, Egypt

Epitaxial superlattices of half-metal, colossal magnetoresistive $La_{2/3}Ca_{1/3}MnO_3$ (HM-CMR) and high-T_c superconducting $YBa_2Cu_3O_7$(HTSC) are grown with thicker and thinner modulation lengths (Λ) of YBCO/LCMO, with Λ = 280 nm (3D-magnetic domains) and 12.5 nm (2D-magnetic domains); respectively, on $SrTiO_3$ (001) single-crystalline substrates by pulsed laser deposition. Transport measurements *R*(T) show a resistive state below T = 35 K although the superconducting transition temperature is found to be T_c = 60 K and 63 K for both different superlattices, respectively. The onset of the resistive state coincides with a magnetic transition of the samples. This can be explained by a diffusion of spin-polarized quasiparticles into the superconducting film. Which can be considered as evidence for \textit{inverse}-proximity effects over a wide temperature range in HM-CMR/HTSC heterostructures.

PO(A)-2

Simulation for Effective Dielectric Properties Response of Nano-Composite Materials

A. Thabet, Y. A. Mobarak and M. Abdrbo

Aswan, Nanotechnology Research Centre NTRC,
High Institute of Energy, South Valley University, Egypt.

This work is a study of the dielectric properties of composites where each embedded spherical inclusion is surrounded by an inhomogeneous inter-phase, and effect of inhomogeneous inter-phase on the bulk modulus of a composite containing spherical inclusion. Here we derive a coupled pair of differential equations using the theory of mechanical properties of fibre-strengthened materials. These differential equations model the dielectric properties of composites for a wide class of functions describing the inter-phase inhomogeneity and are depicts to coincide with the equation obtained using DEDA. It is also shown how the model may be combined with the model of Vo and Shi. Towards model-based engineering of optoelectronic packaging materials dielectric constant modeling. The differential equations are solved for two different profiles and the result of the combined models is compared.

PO(A)-3

Photosensing Properties of p-Channel Organic Field Effect Transistor on Flexible Substrate

Fahrettin Yakuphanoglu

Physics Department, Firat University, 23169, Elazig, Turkey

Organic thin-film transistors (OTFTs) have been extensively investigated due to their low-cost, low-temperature process, and compatibility with flexible substrate. In present study, pentacene thin-film transistor was fabricated with 240 nm poly-4-vinylphenol (PVP) dielectric layer. The electrical and photosensing properties of organic pentacene thin-film transistor fabricated on polyethersulphone (PES) substrate have been investigated. The transistor fabricated on PES showed p-type OTFT characteristics. For photosensing characterization, the output characteristics of the pentacene thin film transistor were measured under various illumination conditions. In the OFF-state, the photoresponse of the transistors increases with illumination intensity and the transistor exhibits a photosensing behaviour.

PO(A)-4

Simulation Model for Calculating the Dielectric Properties of Nano-Composite Materials Comprehensive Inter-Phase Approach

A. Thabet, Y. A. Mobarak and M. Samir

Nanotechnology Research Centre NTRC, High Institute of Energy, South Valley University, Aswan, Egypt.

The chemical structural level of a polymer composite, with an interfacial region is comprised of molecules of the polymer matrix bonded to the surface of the filler particle. This interfacial-bonding region is termed the "inter-phase" and results from the confining effect that the rigid filler particles have on the mobility of the polymer molecules in the matrix. The model takes into account interactions between the components of the composite system in the form of inter-phase regions. The resultant model, termed the inter-phase power-law (IPL) model, relies on the permittivity of the filler component, the matrix component and the inter-phase region as well as the volume fractions of each. The IPL Model is based on a simple extension of a general power law model in which a composite system containing filler, inter-phase and matrix regions may be treated as a unique three-component composite system comprising two primary components (matrix and filler) and an inter-phase region that is inextricably dependent upon the characteristics of the filler and matrix components. The cause and effects of the inter-phase region on a variety of complex composite systems is investigated. Effects of the composite filler types and filler surface areas as well as the dielectric characteristics of the inter-phase region are explored.

PO(A)-5

Evaluation of Hybrid Chitosan-Cellulose Biodegradable Scaffolds for Tissue Engineering Applications

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Natural polymers continue to provide effective biocompatible scaffolds for use in tissue engineering applications. In some respects, their chemical structure closely mimics that of the extracelluar matrix of biological tissues. Even though a wide variety of biopolymers can be used for these applications, no single polymer has been yet found to fulfill all requirements needed in a scaffold material. In an attempt to combine the advantages of two natural polymers, hybrid scaffolds of chitosan/cellulose constructs had been evaluated as candidates for tissue engineering applications. Four groups of hybrid chitosan/cellulose scaffolds were prepared with different cellulose concentrations. The surface and bulk porosities scaffolds have been examined using scanning electron microscope (SEM). The SEM photographs revealed that all hybrid scaffold groups exhibited an interconnected highly porous structure. Percent porosity and pore volume distribution were evaluated using mercury intrusion porosimetry (MIP). The scaffolds were mechanically tested to evaluate their compressive strength. The biodegradation rate in lysozyme-containing saline had been also determined over a six week period. The MIP results showed that all scaffolds had percent porosity in excess of 75% and that the percent porosity decreased by increasing the cellulose concentration. The incremental intrusion versus diameter curves

revealed that most of the scaffolds porosity occurred in the macro-scale. The compressive strength of the scaffold showed an increase with an increase in the cellulose concentration. However, the biodegradation rate was found to vary inversely with the cellulose content in the hybrid. In order to evaluate the cytocompatibility of the chitosan-based scaffolds, mesenchymal stem cells were statically seeded and their attachment had been evaluated. The results revealed that after three and eight day of seeding, the scaffolds became highly populated with cells. This serves as a clear indicatation that the scaffolds thus investigated promote cell attachment and support cell proliferation and proliferation. Thus, the investigated scaffolds are promising candidates for tissue engineering applications.

PO(A)-6

Simulation of Electromagnetic Radiation Patterns of Microstrip Antennas in RFID Systems

A. H. Yahia, N. M. Shaalan,
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Modeling and simulation of electromagnetic radiation of microstrip antennas, in Radio Frequency Identification (RFID) systems, have been realized. The fields of RFID tags have been optimized for different frequencies and materials. Specific absorption rate (SAR) due to the use of these devices has also been investigated to get the lowest possible absorption dose to comply with the universal standards. The simulation shows that the electromagnetic radiation levels are less than the acceptable standard for various materials at two different operating frequencies which is safe and important for mobile system applications.

PO(A)-7

Modeling and Simulation of Nanotechnology Based Tag Antennas

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Modeling, simulation and optimization of microstrip antenna design using nano conductive ink technology (NCIT) have been performed. The high conductivity of NCIT materials showed improved efficiency and high capabilities at high frequencies (microwaves). This is also due to the improved UHF and microwave conductivity of the NCIT conductor. The simulation of VSWR and S-matrix of various nano ink materials have been carried out and compared with each other. They also have been compared with their counterparts for traditional antennas. Improved performance characteristics have been predicted.

PO(A)-8

Preparation and Optical Characterization of CdTe\CdSe Core Shell Quantum Dots

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Laser Induced Fluorescence (LIF) technique is used to monitor the change in the emission properties of core shell CdTe CdSe nanocomposites. The samples at different temperatures have been excited by 488 nm using different excitation power ranging from 2mW up till 200 mW. LIF is used to study multiexciton effect such as monoexciton, biexciton and trion. Lasing properties of semiconductor nanoparticles have been examined by measuring the multiexciton effect.

PO(A)-9
A Optical Study on Absorption Edge, Refractive Index and Dielectric Function Parameters of an Organic Thin Film

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The optical absorption edge, refractive index and dielectric function of some the organic thin films having different thickness were determined by optical spectra. The optical constants such as refractive index and dielectric constant of the thin films were determined and the experimental data revealed existence of direct transitions in the optical band gap. The important changes in absorption edge, refractive index and the dielectric constant were observed due to film thickness. The most significant result of the present study is to indicate that thickness of the film can be used to modify in the optical band gaps and optical constant of the thin films.

PO(A)-10

Simulation of Archimedean Spiral Antenna

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This paper describes a design of the Self-Complementary Archimedean Spiral Antenna (SCASA).Antenna structure is optimized in the frequency range from 0.5 to 18 GHz. Simulations of a broadband Archimedean Spiral antenna with the Method of Moments have been presented. The current distribution on the Archimedean spiral antenna circumference is presented. Due to relatively constant phase center and radiation pattern with frequency the spiral antenna is suitable for broadband applications.

PO(A)-11

Nanometallic Photonic Crystals and its Applications

Hussein A Elsayed

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In this paper, we theoretically studied the propagation of the electromagnetic waves in one dimensional metallic-dielectric photonic crystals (1DMDPCs) by using the transfer matrix method in visible and infrared regions. We have investigated the photonic band gap by using four kinds of metals; Silver, Lithium, Gold and Copper, to form metallic photonic crystals. Transmittance dependence on the layer thickness, the Plasmon frequency and the skin depth of the metals were also studied. Our results have a potential for applications in optical devices because it is easy and cheap for manufacturing.

PO(A)-12

Optical Properties of New Types of One-dimensional Photonic Crystals

Arafa H. Aly

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We present the optical properties of new types of one-dimensional periodic structures as functions of the frequency of the electromagnetic field incident on them for different thicknesses of the layers from which they are formed. The first type of structure consists of alternating layers of a dielectric material and a lossy metal that is defined by the Drude model. The second type of structure consists of alternating layers of a dielectric material and a superconductor whose dielectric properties are described by the two-fluid model. The variance of the intensity and the bandwidth of the transmittance are strongly dependent on the thicknesses, temperature and frequencies. We have compared between the optical properties and present some details about the new types of structure.

Paper Session (B)

Tuesday, 23th March, 2010
(18:00-19:30)

Chairmen

Prof. Dr. Ulrich Schubert
Prof. Dr. Abdel Hadi Kassiba

PO(B)-1

Advanced Materials Engineering and Nanotechnology

M. S. Al Esnawy

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This tutorial will cover the following topics: Introduction to advanced materials engineering and nanotechnology and their applications, ferroelectric nanomaterials and nanovolatile read access memories, nanocharacterisations and nanofabrications of functional heterostructures using focused ion beam (FIB) , pulsed laser deposition and transmission electron microscope (TEM), renewable energy and development of third generation Si thin film photovoltaic solar cells.

PO(B)-2

Effect of Gd-Substitution on Microstructure and Magnetic Properties of Ni-Cd Ferrites Prepared by Ceramic Method

M. M. Eltabey

Basic Engineering Science Department, Faculty of Engineering, Menoufiya University, Shebin El-Kom, Egypt.

Two different groups (I and II which are fired one and two times respectively) from Ni-Cd ferrites of chemical formulas $Ni_{0.7}Cd_{0.3}Gd_xFe_{2-x}O_4$ (x = 0 to x = 0.1 with step = 0.025) have been prepared by conventional ceramic method. The effect of Gd–substitution on the microstructure and magnetic properties of the two groups has been studied. X-ray patterns indicated the presence of a minor secondary phase with the spinel phase at Gd –concentrations with x = 0.075 and 0.1. SEM and VSM are used to investigate the microstructure and to measure the magnetization of the samples at room temperature respectively. The initial permeability is measured, on toroidal samples used as transformer cores, as a function of temperature at constant frequency of 10 KHz and Curie temperature is determined. It was found that there are considerable differences in the microstructure and the magnetic properties of the two groups. Although the Gd-substitute decreased the values of both saturation magnetization M_S and initial permeability μ_i the value of Curie temperature T_C has been improved.

PO(B)-3

D.C. Conductivity and Magnetic Permeability of Nano-Structured Ferrite/PPy Composite Samples Compared to the Corresponding Ferrite Samples

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**Chemistry Department, Faculty of Science, Tanta University, Tanta, Egypt*

$Ni_xZn_{1-x}Fe_2O_4$ nano-particle powder (x = 0, 0.25, 0.5, 0.75, 1) previously synthesized by chemical co-precipitation method have been used to prepare five composite samples of ferrite/PPy (40% wt: 60%wt respectively). The composite samples were characterized by IR spectroscopy. The DC conductivity and the magnetic relative permeability were measured as functions of temperature for all samples. There is an obvious decrease in both D.C. conductivity and initial permeability measurements of the ferrite/PPy samples compared to the corresponding ferrite samples.

PO(B)-4

Spectroscopic, Electrical and Dielectric Studies on CoSo4 – Doped poly (vinyl alcohol)

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The effect of $CoSO_4$ doping on the optical and electrical behavior of a polymer poly (vinyl alcohol) (PVA) were studied. pure and $CoSO_4$ doped PVA films were prepared using solvent casting method. These films were characterized using UV–visible spectra, electric, and dielectric properties at different temperatures and frequencies. A weak (and broad) visible absorption band at about 510 nm is noticed for the doped samples, the intensity of such band is increased by increasing the content of $CoSO_4$. This band is attributed to 4T1g (F) - 4T1g (P) transition for the hexaqucobalt (II). Optical band energy gap is estimated using UV–visible spectra and it decreases with increasing doping concentration, which arises due to the interaction of doping with PVA causing a molecular rearrangement within the amorphous phase of polymer. These modifications also influence the optical property of the doped polymer. The frequency dependence of a.c. electrical conductivity, $\sigma(\omega)$ at a certain temperature, were found to fit the equation $\sigma(\omega) = A\omega S$ quite well. The temperature dependence of a.c. electrical conductivity suggested an electronic hopping conduction mechanism in a thermally assisted electric field, in addition to some theoretical mechanism has been discussed. Also the different values of activation energy as a function of different molecular weights have been investigated, and it was found that the activation energy for most samples increases with the increasing of wt% $CoSO_4$. On the other hand the temperature and frequency dependences of dielectric constant εr, and dielectric loss εr were studied for all present samples.

PO(B)-5

Elastic Scaffolds for Tissue Engineering Applications

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Mechanical properties of scaffolds used for cartilage repair are considered the paramount factors in articular cartilage regeneration. In this paper, elastic scaffold / hydroxyapatite HA particles nano-elastic-composites are prepared. The HA nanoparticles w ere synthesized employing low temperature precipitation techniques. The effects of variation of the proportions of carboxymethyl cellulose CMC , volume fraction of HA, and temperature on the mechanical response of the porous and nonporous scaffolds have been investigated and the results were evaluated statistically. The results showed that the addition of CMC and an increase in temperature resulted in a significant reduction in the tensile elastic modulus and an enhanced strength, albeit. On the other hand, addition of HA nanoparticles led to increase in the strength, as expected. Enhanced elastic modulus of the scaffold reflected as enhanced resistance of the porous scaffolds against mechanical load. On other hand, such elastic scaffold could be converted to rigid ones by heat treatment and thus can be used for load bearing bone tissue engineering applications.

PO(B)-6

Effect of Ti and Zr Additions on Mechanical Properties of 2618 Aluminum Alloy

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[2]Project planning department manager, Ministry of Military Production
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The effect of addison of 0.4%Ti and 0.2 % Zr as well as deformation aging treatment (DAT) on mechanical properties of 2618 alloy at different temperatures (tensile strength, yield, and elongation) was evaluated. Hardness values were evaluated at room and elevated temperature. Microstructure was investigated using OM and SEM as well as energy dispersive X-ray spectroscopy (EDXS). Cast billets of 196 mm diameter and 500 mm length were homogenized at 480 °C for 11 hours, hot extruded at 425 °C through a 6-holes die to bars of 20.5 mm diameter. Quenching process, followed by artificial aging treatment at 200°C for 20 hours performed. After drawing specimens to 18mm diameter, a finale aging treatment (T8) carried out. Results showed that, irrespective of alloy type, and treatment condition, the ultimate tensile strength and yield slightly decreased with increasing temperature from 25 to 200°C, while elongation percent increases. Also, the Brinell hardness values were found to be slightly decreased. DAT improves the tensile and yield strength of 2618 alloy, while elongation percent decreases. For the different alloys, a slight increase in grain size has occurred with increasing temperature to 200 °C. Addition of Ti and Zr refine the grain size of 2618 alloy by about 15 %. The matrix consists of solid solution of Al_2CuMg and the main precipitates at the different temperatures are rich in iron and nickel, forming Al9FeNi phase.

PO(B)-7

Study of Some Physical Properties of Composite Ferrite

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Systems of composites (1-x) $Co_{0.6}$ $Zn_{0.4}$ Fe_2 O_4 –x mol% $BaTiO_3$ (x=0, 0.25, 0.75 and 1) were prepared by general ceramic method. The dc resistivity was measured and increases with increasing temperature for $BaTiO_3$ and 25 mol% ferrite. The resistivity of $Co_{0.6}$ $Zn_{0.4}$ Fe_2 O_4 decreases with increasing temperature and then regions were observed. The dielectric constant of the different composites was studied also. The magnetoelectric coefficient decreased with increasing magnetic field which is due to the low resistivity of ferrites.

PO(B)-8

Study on the Influence of Strontium Doping on the Neodymium Ferrimanaganites

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The present paper deals with studying the influence of strontium doping on the crystal and magnetic structure of Neodymium ferrimanagnites. The electrical and magnetic properties were studies as well. These composites were prepared using solid state reaction. The X-ray diffraction measurements showed that both $NdFe_{0.6}Mn_{0.4}O_3$ and $Nd_{0.65}Sr_{0.35}Fe_{0.6}Mn_{0.4}O_3$ samples have single phase of the orthorhombic distortion perovskite-like structure of space group Pbnm The transition from the pure ferromagnetic ordering into the non-collinear ordering (weak ferromagnetic) occurs at 520 K for $Nd_{0.65}Sr_{0.35}Fe_{0.6}Mn_{0.4}O_3$. There is no change in the magnetic ordering (the non-collinear ordering) of the $NdFe_{0.6}Mn_{0.4}O_3$ composite at different low temperature neutron diffraction measurement (the observed change only in the magnitude of the magnetic moment). The semiconductor behavior was observed for both under-investigated samples. Mössbauer temperature dependence measurements show that the transition to paramagnetic phase in the $Nd_{0.65}Sr_{0.35}Fe_{0.6}Mn_{0.4}O_3$ composite is obtained at $T \approx 550$ K.

PO(B)-9

The Effect of Substitution of Manganese by ^{57}Fe in $Yb_{0.6}Sr_{0.4}MnO_3$

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The present work deals with studying the effect of very small substitution of Manganese by Iron-57 in $Yb_{0.6}Sr_{0.4}MnO_3$. The microstructure of $Yb_{0.6}Sr_{0.4}Mn_xFe_{1-x}O_3$ (x = 1 and x = 0.98) semiconductor composites has been studied. In the case of x = 0.98 concentration two samples are prepared (one with Iron–57 and the other with natural Iron). Theses semiconductor composites were prepared via solid state reaction using pure oxides of Ytterbium (Yb_2O ~ 99.9%), Iron (Fe_2O_3 ~ 99.9% and $^{57}Fe_2O_3$ ~ 99.99%), Manganese (Mn_2O_3 ~ 99.99%) and Strontium (SrO ~ 99.9%). The sintering temperature was 1350 °C for 40 h. The synthesized semiconductor composites were studied in details in terms of their morphological and structural properties. The energy dispersive spectroscopy EDS reveals that the synthesized composites are in proper stiochiometry of the proposed structure. The X-ray analysis showed that crystal structure for both composites; x = 1.0 and x = 0.98 are almost the same and possessing single phase. They have hexagonal structure of a space group P63cm (185). The measured lattice constants for the synthesized composites were found to be a = b = 6.0618 Å and c = 11.3439 Å for the composite with x = 1 and a = b = 6.068 Å and c = 11.39 Å for the composite with x = 0.98 ($Yb_{0.6}Sr_{0.4}Mn_{0.98}{}^{57}Fe_{0.02}O_3$ and $Yb_{0.6}Sr_{0.4}Mn_{0.98}Fe_{0.02}O_3$). The low ratio of ^{57}Fe substitution enables to study the magnetic properties of manganites using Mössbauer effect where the crystal structure is identical. But it is observed in our case that the microstructure are not the same due to low ratio of ^{57}Fe substitution. Both composites of the same x = 98 have identical particle size (2.76 μm) and the difference in particle size was obtained for the composite with x = 1.0 (4.39 μm). This work was carried out in the frame of Najran University grant (NU 04/09).

PO(B)-10

Simulation for Effective Dielectric Properties Response of Nano-Composite Materials

A. Thabet[1], Y. A. Mobarak[2] and M. Abdrbo[3]

Aswan, Nanotechnology Research Centre NTRC, High Institute of Energy, South Valley University, Egypt.

This work is a study of the dielectric properties of composites where each embedded spherical inclusion is surrounded by an inhomogeneous inter-phase, and effect of inhomogeneous inter-phase on the bulk modulus of a composite containing spherical inclusion. Here we derive a coupled pair of differential equations using the theory of mechanical properties of fibre-strengthened materials. These differential equations model the dielectric properties of composites for a wide class of functions describing the inter-phase inhomogeneity and are depicts to coincide with the equation obtained using DEDA. It is also shown how the model may be combined with the model of V_o and Shi. Towards model-based engineering of optoelectronic packaging materials dielectric constant modeling. The differential equations are solved for two different profiles and the result of the combined models is compared.

PO(B)-11

Testing Natural Aging on Properties of 6066 & 6063 Alloys Using Vickers Hardness & Positron Annihilation Lifetime Techniques

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The aim of this work was to produce a high strength 6xxx series Aluminum alloy by adjusting the processing conditions, namely solutionizing and natural aging. It consists of heating the alloy to a temperature at which the soluble constituents will form a homogeneous mass by solid diffusion, holding the mass at that temperature until diffusion takes place, then quenching the alloy rapidly to retain the homogeneous condition. In the quenched condition, heat-treated alloys are supersaturated solid solutions that are comparatively soft and workable, and unstable, depending on composition. At room temperature, the alloying constituents of some alloys tend to precipitate from the solution spontaneously, causing the metal to harden in about four days. This is called natural aging. The mechanical characterization of heat treatable 6xxx (Al-Mg-Si-Cu based) 6066, 6063 wrought aluminum alloys was studied. Their effects were investigated in terms of microstructure using positron annihilation lifetime technique and mechanical properties by hardness measurements. The hardness is the Resistance of material to plastic deformation, which gives it the ability to resist deformed when a load is applied. The greater the hardness of the material, the greater resistance it has to deformation. Hardness measurement can be defined as macro-, micro- or nano- scale according to the forces applied and displacements obtained. Micro hardness is the hardness of a material as determined by forcing an indenter such as a Vickers indenter into the surface of the material under 15 to 1000 gf load; usually, the indentations are so small that they must be measured with a microscope. During this work we are monitoring the effect of natural aging on the properties of positron lifetime and Vickers hardness

parameters. The Vickers hardness of 6066 alloy has a maximum value (80) after (10) days of quenching at 530 which is the solution temperature of this alloy .the hardness of 6063 alloy has a maximum value (40) after (14)days of quenching at 520 which is the solution temperature of this alloy. The hardness which is conformed to the references.

PO(B)-12

Nuclear Techniques (Positron Annihilation) For Detecting Defects In Aircraft Material (7075)

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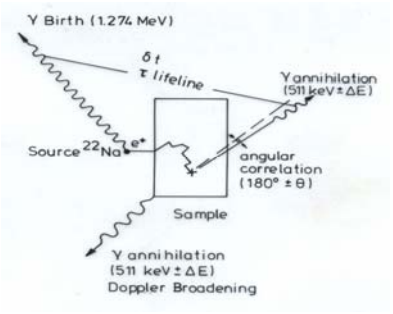
Positron spectroscopy is one of the nuclear techniques used in material science. This technique is a unique as a nondestructive testing technique. This technique is realizing the study of defect information by the electron density as in lifetime technique and in the electron momentum as the techniques of Doppler broadening and angular correlation. This work aims to discuss the details of defects formations and migration of different type of defect in material under investigation. In this work the material of study is 7075 aircraft alloy. This work is undertaken the following items for one of the most important wrought aluminum alloy 7075.

- ✓ **Formation enthalpy**
- ✓ **Migration enthalpy**
- ☒ **Grain size relation**
- ☒ **Defect densities**
- ☒ **Natural aging**



An article on photon induced positron annihilation (PIPA). In the article, we discussed a new technology that allows an inspector to detect damage to material at an atomic level before any visible damage is apparent. In this article, we will discuss some advances made by Positron Systems in this inspection technology that allows inspectors greater flexibility to inspect airframe and engine components.

Paper Session (C)

Wednesday, 24th March, 2010
(18:00-19:30)

Chairmen

Prof. Dr. Guido Kickelbick
Prof. Dr. Fahrettin Yakuphanoglu

PO(C)-1

Synthesis, Characterization and Photocatalytic Property of TiO_2 and TiO_2-Ln Nanocrystals

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Preparation and characterization of nano sized TiO_2 and TiO_2-Ln nanocrystals are presented. Firstly, TiO_2 was obtained by simultaneous precipitation from solutions of $TiCl_3$. Secondly TiO_2-Ln nanocrystals was obtained by precipitation from solutions of $TiCl_3$ and an organic phase of di-(2-ethyl hexyl) phosphoric acid (HDEHP)loaded by lanthanides come from Abu Tartur phosphate ore. The effects of the synthesis method and the doping by lanthanides on phase, surface area, crystallite size were studied. Also the photodegradation of three commercial dyes were studied by XRD, SEM, I.R, UV/Vis and Raman spectroscopy techniques. It was found that the major phase of the synthesized TiO_2 was anatase. Also the results showed that photocatalytic efficiency of TiO_2 was remarkably enhanced owing to lanthanide ions doping. Furthermore, the doping of TiO_2 by lanthanides increase the UV/Vis absorption values of TiO_2 and make the absorption peak extended to longer wavelengths. The degradation kinetics of the three used dyes, blue, green and yellow was investigated. The rate kinetics was found to obey first order kinetics. The experiments show that TiO_2-Ln achieved lower rates of degradation for blue and green dyes and higher rates for yellow dye than the undoped TiO_2.

PO(C)-2

Structural Investigation and Electric Properties of Multiferroic $La_{1-x}Sb_xFeO_3$, $0.0 \leq x \leq 0.3$

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Orthoferrite samples of the formula $La_{1-x}Sb_xFeO_3$, $0.0 \leq x \leq 0.3$ were prepared using double ceramic technique. Many experimental techniques such as structural analysis using X-ray diffraction (XRD), transmission electron microscope (TEM) and the electrical properties (dielectric constant, dielectric loss and ac conductivity) were carried out to study the characterization of the prepared samples. The variation of the lattice parameters with Sb^{3+} content was observed and reported. The crystallite size was also changed as a function of Sb3+ content. An improvement of the electrical properties was achieved. The conductivity (α) increases from 0.002366 Ω^{-1}. m^{-1} for the $LaFeO_3$ to 0.0301 Ω^{-1}. m^{-1} for the sample $La_{0.95}Sb_{0.05}FeO_3$ at T = 553 K and frequency 1 MHz. Also, the dielectric constant ($\acute{\varepsilon}$) increased with increasing the Sb^{+3} content.

PO(C)-3

Electrochemical Deposition of Cadmium Telluride Films for Using in the Photovoltaic Cell

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CdTe films were electrochemically deposited on Pt rotating disc electrode by electrochemical methods. The different preparative parameters, such as bath composition and rotation rate effect have been studied by cyclic voltammetry and linear sweep voltammetric techniques to get good quality materials using different scan rates. The electrodeposition of CdTe was proceeded using a solution contains the two ions in acidic medium. The concentration of Cd ion was 0.1 M and different concentrations of Te ions were employed starting from 0.001 up to 0.01M. SEM of the electrodeposited CdTe on silver substrate was carried out. The morphology of the CdTe crystal was fibrous with average particle size of about 50-100 nm. The XRD pattern of the electrochemical deposited CdTe showed the characteristic peaks of CdTe crystalline planes. The structural features fit into cubic one. The UV-VIS-NIR spectrophotometer measurements were carried out. The electrodeposited CdTe exhibited a sharp absorption edge around 800 nm. The determined energy band gap was 1.55 eV.

PO(C)-4

The Effect of Cobalt-Doping on Some of the Optical Properties of Glycine Zinc Sulfate (GZS) Single Crystal

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Glycine Zinc Sulfate (GZS) single crystals, pure and doped with three different ratios of cobalt ions were synthesized and grown by the slow evaporation technique of aqueous solutions at 34 °C. Optically transparent single crystals with dimensions up to $2\times1.5\times1.2cm^3$ were obtained in about four weeks. The optical transmittance was measured and used to study some optical properties for these crystals. Pure GZS crystal has high optical transmittance in the whole visible range and UV transparency with lower cut off wavelength at 300 nm. By adding Co-ions to GZS crystal, the transmittance decreases and the value of cut off shifts to the higher wavelengths with increasing Co ratio and the transmission bottom is formed around 592 nm. The depth of this transmission bottom increases with increasing Co ratio. Adding Co-dopants to GZS crystal has other effects like increasing the magnitude of the absorption coefficient (α) and forming an absorption band around 2.1 eV. The height of this absorption band increases with increasing Co ratio. The optical energy gap (E_g) for pure GZS crystal is about 3.80 eV. This value decreases with increasing Co ratio to GZS crystals. The predominant optical transition for pure and Co-doped GZS crystals is the allowed indirect one. The phonon energy (E_p) and the phonon equivalent temperature (T_p) at room temperature are 0.20 eV and 318.84 K for pure GZS crystal respectively and these values increases with increasing Co content in GZS crystals.

PO(C)-5

Deposition and Characterization of Metal Sulfide Nano-Structured Thin Films by Dip Coating Technique

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In this study, three categories of compound semiconductor such as CdZnS, PbS thin films were deposited using simple dip coating technique. ZnCdS is an example for wide band gap semiconductors, $CuInS_2$ is an example for intermediate band gap while PbS is an example for narrow gap semiconductors. The technique is based on solid state reaction between metal acetate and thiourea. Thin films of the reactants was formed by dissolving the equal molar ratio of metal acetate and thiourea in ethanol at concentration in the range 0.1-0.2 mol. Clean glass substrates were dipped in the solution after worming at 50 ^oC and pulled out the solution with constant and slow rate with speed 1 cm/min. After drying in air, the reaction of the solid materials in the film reacts at temperature in the range 150-200 ^oC in air using a muffle for 1 h. the resultant films possesses good quality, high film coverage to the substrate and high uniformity. XRD, SEM and optical characterization shows that the nanocrystalline films of crystallite size in the range 2.5-20 nm was obtained. Stiochiometric compositions of the constituent materials. Tunable absorption edge and band gap as a result of energy gap confinement effect of nanocrystalline materials were obtained.

PO(C)-6

Fourier-Transform Infrared and Optical Absorption Spectra of P-N,N-dimethylaminobenzylidenemalononitrile (DBM) Thin Films.

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Thin films of P-N,N-dimethylaminobenzylidenemalononitrile (DBM) were prepared for the first time using thermal evaporation technique. The molecular structure and electronic transitions of DBM films were investigated by Fourier-transform infrared (FTIR) and ultraviolet–visible (UV–vis) spectra. The observed vibrational wavenumbers in FTIR spectra were analyzed and assigned to different normal modes of the molecule. UV–vis electronic absorption spectral measurements of DBM films were analyzed to obtain the electronic transitions and optical band gap (E_g). Other important optical parameters such as molar extinction coefficient (ε molar), the oscillator strength (f) and the electric dipole strength ($q2$) were also reported.

PO(C)-7

Carrier Conduction Mechanisms and Photovoltaic Characteristics of Sodium Copper Chlorophylline/ p-GaAs Organic/inorganic Heterojunction

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The junction between sodium copper chlorophylline,SCC and p-GaAs was fabricated by spin coating technique and was found to be of rectifying characteristics. The dark current–voltage (*I–V*) measurements were performed in the temperature range 300 to 400 K. The measured electrical parameters were used to determine the conduction mechanisms of this heterojunction. The forward current was found to be increased exponentially with the applied voltage in the region of $V \leq 0.3$ V, which was dominated by the thermionic emission over the SCC/p-GaAs interface. In the region $0.4 < V \leq 1$ V, the current transport was due to the space-charge-limited current controlled by single trap level. A free carrier concentration and built-in potential were estimated from the dark capacitance–voltage measurements at 1 MHz. The current-voltage characteristics were also studied for SCC/p-GaAs heterojunction under illumination and the photovoltaic parameters were evaluated.

PO(C)-8

Optical Band Gap and Refractive Index Dispersion Parameters of In-Se-Te Amorphous Films

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Amorphous $In_xSe_{75}Te_{25-x}$ thin films with ($0 \leq x \leq 10$ at. %) were deposited onto glass substrates by using thermal evaporation method. The transmission spectra $T(\lambda)$ of the films at normal incidence were measured in the wavelength range 400-2500 nm. A straightforward analysis proposed by Swanepoel, based on the use of the maxima and minima of the interference fringes has been used to drive the film thickness, d, the complex index of refraction, n, and the extinction coefficient, k. The dispersion of the refractive index is discussed in terms of the single-oscillator Wemple and DiDomenico model (WDD). Increasing In content is found to affect the refractive index and the extinction coefficient of the $In_xSe_{75}Te_{25-x}$ films. With increasing In content the optical band gap decreases while the refractive index increases. The optical absorption is due to allowed non-direct transition. The chemical bond approach has been applied successfully to interpret the increase of the optical gap with increasing In content.

PO(C)-9

Preparation and Characterization of Novel Chitosan Derivatives for Biomedical Applications

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New chemical route was used to modify antibacterial activity and solubility of chitosan through grafting of extra amine groups to its glucose backbone structure. As a result, the nitrogen content of modified chitosan was increased by about 30 %. The grafting process was verified with FT-IR, TGA analysis and solubility test. The solubility of modified chitosan was increased by about 100 % and 65% in pH values 5.0 and 6.0, respectively. Modified chitosan membranes were prepared, characterized and evaluated for biomedical applications. The modified chitosan membranes were characterized from physicochemical point of view. Properties like water uptake, tensile strength, elongation, water vapor permeability and surface roughness were monitored. Bio-evaluation of the modified chitosan membranes has been done through investigation of its antibacterial activity against different microorganisms. The antibacterial activity has been improved against two gram negative bacteria, Escherichia coli and pseudomonas aeruginosa, by 50% and 40%, respectively, and against two gram positive bacteria, Bacillus cereus and Staphylococcus aureus, by 114% and 45%, respectively. Moreover, biocompatibility characters like cytotoxicity and Haemo-compatibility were estimated. The obtained modified chitosan membranes show high profile as a novel biomaterial for prospective biomedical applications.

PO(C)-10

Controlling Metal/Semiconductor Junction Barrier by Phthalocyanine Organic Semiconductor

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We study how phthalocyanine at semiconductor/metal interface can affect electrical transport across the interface of the junction. Thin film of phthalocyanine organic semiconductor was prepared on p-type silicon by drop coating method. The Al/CuPc/p-Si structure demonstrated rectifying behavior by the current-voltage *(I-V)* curves studied at room temperature. The barrier height and ideality factor values were obtained as of 0.753 eV and 1.99 respectively. The diode shows a non-ideal behavior with an ideality factor greater than unity that could be ascribed to the interfacial layer, the interface states and the series resistance. The interface-state density has an exponential rise with bias from the midgap towards the top of the valence band. We conclude that phthalocyanine can control electrical transport of the conventional metal/semiconductor devices.

PO(C)-11

Optical Properties of Polyimide/ Silica Nanocomposites

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The optical properties of thin films of polyimide/silica nanocomposites prepared via sol- gel process were investigated as a function of nanosilica particles content. Absorption and reflectance spectra were collected by a spectrophotometer giving UV-radiation of wavelength range 200-800 nm. The optical data obtained were analyzed in terms of absorption formula for non- crystalline materials. The calculated values of the optical energy gap and the width of the energy tails of the localized states exhibited silica concentration dependence. The direct optical energy gap for neat polyimide is about 1.95 eV, and decreases to a value of 1.8 eV for nanocomposite of 25 wt.% nanosilica content. It was found that the calculated refractive index and dielectric constants of nanocomposites increase with silica particles content. The overall dependence of the optical and dielectric constants on silica content in polyimide matrix is argued on the basis of the observed morphology and overlap of the localized energy sates of different color centers. The EMT model was fitted to the observed dielectric data.

PO(C)-12

Solid Lipid Nano Particles (SLN) as Efficient Method for Delivering Hydrophilic Chemotherapeutic Agent

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The aim of this study is to produce and to characterize solid lipid nanoparticles loaded with a hydrophilic chemotherapeutic agent (5-flourouracil) for the aim of treatment of various types of skin cancers. Since 5-flourouracil is known to have limited skin permeability due its hydrophilicity, therefore this study was designed in order to increase its permeability and therapeutic action and to decrease its side effect. The solid lipid nanoparticles were formulated using modified solvent diffusion-evaporation method using an organic phase containing stearic acid, lecithin, and drug in ratios of 1:5:1., 1:10:2.5, 1:5:0.625, 1:10:1.25, 1:5:0.33 and 1:10:0.66 w/w. Characterization of these nanoparticles was carried out using particle size analysis, diffusion study, in vitro release study and zeta potential measurements. Encapsulation efficiency was found to reach up to 54.6% of the loaded drug. Particle size was measured and found to be less than 100 nm in certain formulations with a very low polydispersity index and zeta potential was around 30 in the best studied formulae. Diffusion study was carried out using modified Franz cell diffusion apparatus and showed that SLN formulation was increased the diffusion of 5-flourouracil about 4 folds higher than that of the drug itself. The in vitro release study showed about 2 fold increase in release of 5-flourouracil from SLN than that from drug itself. SLN were then incorporated into 3different gel matrices (HPMC, Na CMC and Chitosan). Diffusion of these SLN and drug from these matrices was performed. This study showed better diffusion of SLN than drug at $p<0.05$. The matrices diffused SLN in the following order NaCMC>

HPMC> Chitosan while they diffused the free 5-FU in the following order Chitosan> HPMC> NaCMC. This indicate that solid lipid nanoparticles is an excellent way to formulate the hydrophilic nanoparticles, however further modifications must be applied to improve the encapsulation efficiency.


POSTER SESSIONS

Poster Session (I)

Tuesday, 23th March, 2010
(11:00-19:30)

PP(I)-1

Study on Structure and Optical Properties of Amorhous Se70In30-xBix Thin Films

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Thin films of chalcogenide alloys $Se_{70}In_{30-x}Bi_x$ are deposited on substrate at room temperature (300K) by thermal evaporation technique. This films are annealed at 375 and 425K for 1h in vacuum ~ 10^{-2}Pa. The optical constant such as refractive index (n) has been determined by a method based on the envelope curves of the optical transmission spectrum at normal incidence by a Sandoval method as-deposited films. The oscillator energy (E_0), dispersion energy (E_d) and other parameters have been determined by the Wemple-DiDomenico method. The effect of Bi in SeIn thin film is studied on the optical energy gap. The absorption coefficient (α) has been determined from the reflectivity and transmitivity spectrum in the rang 500-2500nm. The dielectric behavior has been discussed by calculating and drawing the real(ε_r) and the imaginary (ε_i) parts of the dielectric constant as a function of the photon energy (hv).

PP(I)-2

Nanostructure ZnO Semiconductor Materials Synthesized by Sol–Gel Technique

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The iron doped Zinc oxide nanomaterials were synthesized by sol gel method. The structural, electrical and optical properties of Fe doped ZnO materials have been investigated. X-ray diffraction results confirmed the hexagonal wurtzite structure of synthesized materials. The crystallite size for Fe doped ZnO materials was determined and it was found to vary from 18.2 nm to 24 nm with increase in Fe dopant. The nanostructure of Fe doped ZnO materials were confirmed by atomic force microscopy measurements. The grain size of the materials was decreased by increasing Fe dopant. The electrical conductivity of Fe doped ZnO materials increases with temperature. This suggests that the materials are typical semiconductors. The optical band gap, as determined from reflectance spectra, was decreased to 2.82 eV for %20 Fe dopant as compared with undoped ZnO for which the band gap is 3.19 eV. It is evaluated that the nanostructure controls the semiconducting behavior of Fe doped ZnO materials.

PP(I)-3

Current–Voltage (*I–V*) and Interface State Density (G_{it}-ω) Studies of ZnO :Co/p-Silicon Diode Structures Fabricated by Sol Gel

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The heterojunction diodes on cobalt doped zinc oxide (ZnO) were developed using the sol gel deposition method. The compositional fraction of Cobalt dopant was varied to control the diode electrical parameters. Atomic force microscopy was used to determine the structural properties of ZnO:Co films. The ZnO:Co films has a microfiber structure and structure of microfibers changed with Cobalt dopant. The barrier height and ideality factor values of heterojunction diodes between Si and ZnO:Co with 5% and 15% Co dopants were determined to be 0.75, 0.77 eV and 3.49, 7.51 by the Norde model and thermionic emission model measurement, respectively. Measuring current-voltage and interface state density characteristics, it is concluded that the n-ZnO:Co of 5% dopant/p-Si diode with a high film quality and good interface diode to exhibits the best rectifying property.

PP(I)-4

Study of Production Defects in Pure Al and 3003 Al Alloy by Electrical Measurements

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To study defects properties in the crystal, it is necessary that they are present in sufficiently high concentration. Electrical measurements are one of the oldest techniques also used in materials science. This paper aims to discuss the availability of using electrical measurements as diagnostic techniques to detect defects in a set of plastically deformed pure and 3003 Al alloys wrought aluminum alloys. The results of electrical measurements were analyzed in terms of the variation of resistivity. This model can be used to investigate both the defect and dislocation densities of the samples under investigation. Results obtained by electrical technique have been reported. The plastic deformation was done, while the IV curves where measured in order to get the value of resisitivity. The values of resistivity as a function of deformation and the annealing behavior were studied. One of the goals of that work is to obtain the activation energy for formation defects using the electrical measurements in both materials (pure Al and 3003 Al alloys).

PP(I)-5

Contamination Distribution of Pb and Cd in Some Soils of Libya

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To investigate the distribution of pb and Cd in contaminated soils from three different location in Libya, Allahabad , Aboshiba Agricultural project and Tripoli – zawia high way. The study include sample preparation digestation and measurement of Pb and Cd using Atomic – absorption (6601F) The mean value of lead (pb) concentration in p.p.m for the three location are 0.137, 0.222 and 4.490 for ALhadaba , Abosheba and Tripoli-zawia highway respectively ,also for cadmium (Cd) the main value is 0.075 , 0.097 and 0.027 p.p.m for ALhadaba, abushiba and Tripoli – zawia highway respectively. The contaminated by pb and Cd are degrease in agricultural location compared with Tripoli – zawia highway, this indicating the effect of the pb and Cd source especially automobile traffic

PP(I)-6

Considerations on Targetry and Target Holder Design for High-Intensity Ion-Sources Commercial Accelerators.

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The increasing charge-particle accelerators-produced radionuclide (RI) demand, mostly for clinical and nuclear medicine procedures, requires medium to high-intensity ion-sources output (> 100 μA beam on target, BOT) machines for non nuclear physics facilities. There, machine operators are highly trained technicians but scientists, customarily. High current BOT targets and target holders for high activity yield at end of bombardment requires appropriated alloys/metals materials with suitable mechanical, material and solid state physics properties for innovative new designs, construction, and testing under high activity yield production. Considerations regarding what should be taken into account when designing a target, target holder, and type of material/alloy to choice to build from, when goal is routinely RI production under high-current proton/deuteron BOT irradiations to assure highest possible radionuclidic purity, as well as, non-carrier-added, specific activity under radioprotection safest approach are presented.

PP(I)-7

Microstructure Characterization and Cation Distribution of Nanocrystalline Cobalt Ferrite

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Nanocrystalline cobalt ferrite is synthesized by two different methods: ceramic technique and co-precipitation technique. The formation of nanocrystalline ferrite phase is observed after 3 h of sintering at 1000°C. The structural and microstructural evolutions of the nanophase have been studied by X-ray powder diffraction and the Rietveld method. The refinement result showed that the type of the cationic distribution over the tetrahedral and octahedral sites in the lattice of the nanocrystalline material partially an inverse spinel. Microstructure characterization by Transmission Electronic Microscope (TEM) corroborates the findings of X-ray analysis. The magnetic properties of the samples were characterized by using a Vibrating Sample Magnetometer (VSM).

PP(I)-8

Impedance Spectroscopy for Monitoring the Conduction Mechanism and the Relaxation Process of Organic Semiconductor

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Structure characterization of methyl orange was studied using XRD, TGA, DTA analysis. Ac impedance spectroscopy technique was used to study the conduction mechanism and the relaxation process of organic compound i.e. methyl orange in the frequency range 100 Hz to 1 MHz at different temperatures. Dc electrical conductivity confirms that methyl orange is an organic semiconductor with the calculated electronic parameters. The ac conductivity σ_{ac} showed a variation with angular frequency as $A\omega^s$ with a frequency exponent $s < 1$ suggesting that the correlated barrier hopping CBH model is the dominant conduction mechanism. Values of ac activation energy $\Delta E(\omega)$, the density of states $N(E_F)$ and the binding energy W_m and are calculated. Both real and imaginary ($Z^{/}$ and $Z^{//}$) parts of the impedance was found to be a frequency dependence. It is found that the asymmetric broadening of peaks in frequency dependence of $Z^{//}$ explicit plots suggests that there is a spread of relaxation times i.e., the existence of a temperature-dependent electrical relaxation phenomenon in the material. The complex impedance spectrum (Nyquist plot) of methyl orange was measured at different temperatures.

PP(I)-9

The influence of Thiol-Capping and Refluxing Time on the Characterizations of CdTe Nanoparticles

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In the last two decades, the field of nanoscience and nanotechnology has witnessed tremendous advancement in the synthesis and application of group II-VI colloidal nanocrystals. The synthesis based on high temperature decomposition of organometallic precursors has become one of the most successful methods of making group II-VI colloidal nanocrystals. Compared with the organometallic routes, aqueous synthesis is more reproducible, cheaper, and less toxic, and the as-prepared samples have high aqueous stability and biological compatibility. In the present study, CdTe nanocrystals were synthesized by wet chemical route using potassium tellurite and cadmium chloride as starting materials in different capping agent: Mercaptoacetic Acid (MAA), Mercaptopropionic Acid (MPA) and 2-Mercaptoethanol (ME) at pH ≈ 11.2. The effect of capping agent and refluxing time on the preparation of these samples was measured using UV-Visible absorption and photoluminescence analysis. The particle size was calculated by Debye-Scherrer equation from XRD data, the effective mass approximation (EMA) and TEM image analysis. Further characterization studies such as EDAX, TEM, FT-IR, and Z-scan on the materials were carried out and the results will be discussed in detail. The role of capping agent, refluxing time, pH and reaction procedure on the development of nanoparticles is discussed in detail.

PP(I)-10

Strcture and Electerical Propertes of $Cd_{0.4}Mn_{0.6}Co_xFe_{2-x}O_4$ Ferrite System

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Polycrystalline ferrites with general formula $Cd_{0.4}Mn_{0.6}Co_xFe_{2-x}O_4$ (x=0.00, 0.125, 0.25, 0.375, 0.5, 0.75, and 1.00) were prepared by standard ceramic method. The compounds were characterized by X-ray, and IR techniques. It is clear that these samples are cubic system one phase. Porosity, density , X-ray density and crystal size were measured. The initial magnetic permeability μ_i were measured as function of temperature. The transition temperatures Tc were determined, it was found to be composition dependence. These transition temperatures are found to increase with increasing Co content. Thermoelectric power were measured for all samples. Charge carrier concentration and charge carrier mobility are measured for all the studied samples, as a function of temperature.

PP(I)-11

The AC Electrical Properties, Conduction Mechanism, Hysteresis Loop and ESR Measurements of the $Cd_{0.4}Mn_{0.6}Co_xFe_{2-x}O_4$ Ferrite system

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The electrical (transport) properties of the $Cd_{0.4}Mn_{0.6}Co_xFe_{2-x}O_4$ ferrite system, with ($0.0 \leq x \geq 1.0$), are measured as AC electrical conductivity with a function of temperature and frequency. The results obtained for these materials reveal a semiconductor behavior as Co content increase. All studied compositions exhibit a peaking behavior, with the conductivity versus temperature. The dielectric parameter (ε') and the dielectric loss tangent (tan δ) are measured for all the studied samples, as a function of temperature and frequency. The conduction mechanisms were discussed, the predominant mechanism was found to be the hopping mechanism. Hysteresis loops for the studied samples were done. ESR measurements also were done.

PP(I)-12

Dielectric Properties and ac Conductivity of M-Type Substituted Hexagonal Ferrites

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Samples of the system "Ba Co0.5x Zn0.5x Tix Fe 12-2x O 19" with (x=0.0, 0.4, 0.8, 1.2, 1.6 and 2.0) were prepared by conventional ceramic technique. The x-ray diffraction was used to confirm the existence of single-phase M-type hexagonal ferrites. There is no other signal observed. The A.C conductivity σ (ω) and dielectric properties have been measured at various frequencies and temperatures. The observed results were discussed.

PP(I)-13

Effects of NiO Addition on the Structure and Electric Properties of $Dy_{3-x}Ni_xFe_5O_{12}$ Garnet Ferrite

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Polycrystalline garnet ferrites $Dy_{3-x}Ni_xFe_5O_{12}$ with varying Ni substitutions (x = 0.0, 0.1, 0.2, 0.3, 0.4, and 0.5) have been prepared by the standard ceramic technique and their crystalline structures were investigated by using X-ray diffraction and IR spectroscopy. The X-ray diffraction analysis showed that all samples have a single cubic garnet phase. The materials prepared are identified by infrared rays which indicate the presence of three absorption bands v_2, v_3 and v_4 which represent the tetrahedral, octahedral and dodecahedral sites respectively which characterize the garnet ferrite. The dielectric constant (ε), and dielectric loss (tan δ) of the prepared samples were measured at 1 kHz in the temperature range 300–700 K. The dielectric constant (ε), and dielectric loss (tan δ) are functions of temperature. The initial magnetic permeability has been studied at different temperatures. The initial magnetic permeability (μ_i) increases gradually with increasing temperature and then drops suddenly at a certain temperature T_c.

PP(I)-14

A comparative Study of Electrical Properties of Nano-Structured and Bulk Mn Mg Spinel Ferrite Samples

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Nano-sized particles of Mn1-x Mgx Fe2O4; (x = 0.0, 0.1, 0.2 and 0.25) were prepared by co-precipitation method. The particles had been characterized by X-ray diffraction analysis to be sure of the formation of the ferrite. A part of the samples was sintered at 1200 ºC for 4h to obtain bulk samples via increasing the particle sizes, X-ray diffraction analysis has been performed again for the bulk counterparts, a significant change has been observed in the X-ray charts; The ac conductivity σac, dielectric constant ε′ and the dielectric loss factor tan □ were measured as functions of frequency and temperature for both types of samples i.e. the nano-structured samples and their bulk counterparts.

PP(I)-15

Sol-Gel Synthesis of Nano-Structured Alumina, Titania and Mixed Alumina/Titania in the Ionic Liquid 1-Butyl-1-Methylpyrrolidinium Bis(trifluoromethylsulfonyl) Amide

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In this paper we demonstrate the high potential of air and water stable ionic liquids for the synthesis of nanostructured alumina, titania and mixed alumina-titania via sol-gel methods using aluminium isopropoxide and titanium isopropoxide as precursors. Our results show that the as-synthesized alumina is mainly mesoporous boehmite with an average pore diameter of 3.8 nm. The obtained boehmite is subject to a phase transformation into γ-Al_2O_3 and δ-Al_2O_3 after calcinations at 800 and 1000 ^oC, respectively. The as-synthesized TiO_2 shows amorphous behaviour and calcination at 400 ^oC yields anatase which undergoes a further transformation to rutile at 800 ^oC. The as-prepared alumina-titania powders are amorphous and transformed to rutile and α-Al_2O_3 after calcination at 1000 ^oC TiO_2. The obtained alumina-titania has a higher surface area than those of alumina or titania. The surface area of the as-synthesized alumina-titania was found to exceed 486 $m^2\ g^{-1}$, whereas the surface areas of the as synthesized boehmite and titania were around 100 $m^2\ g^{-1}$, respectively.

PP(I)-16

Synthesis and Charaterization of the Spintronic (DMS) Composite of In $Te_{0.9}$ $Fe_{0.1,}$ In $Te_{0.9}$ $Co_{0.1}$ and In $Se_{0.9}$ $Fe_{0.1}$, In $Se_{0.9}$ $Co_{0.1}$

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The incorporation of the magnetic elements (Fe,Co) into the non-magnetic semiconductors InTe and InSe changes the materials from diamagnetic to ferromagnetic and antiferromagnetic respectively with very low coercivity and very low reminance magnetization. Faraday method was used to measure the magnetic susceptibility at different temperatures as a function of the magnetic field intensity. High Curie temperatures of 783K and 870K were detected respectively for InTe0.9Fe0.1 and InSe0.9Fe0.1. A property that allowed these studied systems to be used in spintronic devices operated at and above the room temperature. The cluster model was adopted to explain the origin of ferromagnetism in these prepared dilutted magnetic semiconductors (DMS). On the other hand, the InTe0.9Co0.1 and In Se0.9 Co0.1 systems each showed two antiferroamagnetic transitions with a paramagnetic phase in between. The origin of the Antiferromagnetic-Paramagnetic-Antiferromagnetic transitions (APA) was discussed. The DC conductivity data for the ferromagnetic systems increased hundred times for In Se0.9 Fe0.1 and a little less for In Te0.9 Fe0.1 than those of InSe and InTe respectively, this was mainly due to the total spin up parallel arrangements of the ferromagnetic carriiers arround the fermi level which will allow the electron spins as well as their charges to contribute to the large increase in the conductivity of the (DMS) materials. The formation of a second phase (confirmed by X- ray diffraction analysis) and also the

presence of the quntum dot nano particles (confirmed by x-rays diffraction and electron microscopy) helped in adopting the clusters models which explain the transfere of the electron spin through non magnetic phase to magnetic phase. At temperature ranging from room temperature to 413 k conduction by variable range hopping was suggested and a high density of localized states around Fermi level was calculated for In Te0.9 Fe0.1. The measured conductivity (σ) increases with temperature due to high spin ordered electron over this range.But at T > 413K, σ decreases since the ordered spin electrons started to decrease due to the randomness of spins on approaching the blocking temperature (TB). For In Se0.9 Fe0.1, due to the high Curie temperature it was not possible to have conductivity measurements at a temperature as high as the Blocking temperature, at which the electron spin ordered started to decrease,accordingly the conductivity (σ) only for the electron spin ordered was measured . Only bands of localized states situated at bandtails were suggested (ΔE=0.43eV). The magnetic and the conductivity results indicate that the incorporation of Fe or Co creates new band configuration and hence modification of the electronic density of states of the studied systems. Moreover, it creat new (DMS) spintronic materials working at room temperatures and above.Correlation of the magnetic and electrical parameters in relation to the spintronic properties are going to be discussed in details in the given paper.

PP(I)-17

Preparation of NiO Nanoparticles from Nickel Anthranilate Metal Complex via Thermal Decomposition route

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This study focuses on the preparation and characterization of single phase NiO nanoparticles. Ni anthranilate complexes were synthesized through semisolid phase reaction method as precursor for the preparation of NiO nanoparticles via a solid-state decomposition procedure at 700˚C. In addition, the effects of the anion and metal-to-ligand ratio on the particle size and morphology of NiO were investigated. Thermogravimetric analysis (TGA) was applied to determine the thermal behavior of complexes and the temperature at which all the metal complexes decompose leaving the oxide. The crystalline structure of products were investigated by X-ray diffraction (XRD), morphology of particles by scanning electron microscopy (SEM) and the particles size was determined by (STM). The average particle size was found to be 7 nm.

PP(I)-18

The electrical properties of the $Cd_{0.4}Mn_{0.6}Co_xFe_{2-x}O_4$ ferrite system

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The electrical (transport) properties of the $Cd_{0.4}Mn_{0.6}Co_xFe_{2-x}O_4$ ferrite system, with ($0.0 \leq x \geq 1.0$), are measured as AC electrical conductivity with a function of temperature and frequency. The results obtained for these materials reveal a semiconductor behavior as Co content increase. All studied compositions exhibit a peaking behavior, with the conductivity versus temperature. The initial magnetic permeability μ_i were measured as function of temperature. The transition temperatures Tc were determined, it was found to be composition dependence. These transition temperatures are found to increase with increasing Co content. The dielectric parameter (ε') and the dielectric loss tangent (tan δ) are measured for all the studied samples, as a function of temperature and frequency. The conduction mechanisms were discussed, the predominant mechanism was found to be the hopping mechanism.

PP(I)-19

Contaminated Distribution of Pb and Cd in Some Soils of Libya

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To investigate the distribution of pb and Cd in contaminated soils from three different location in Libya, Allahabad , Aboshiba Agricultural project and Tripoli – zawia high way. The study include sample preparation digestation and measurement of Pb and Cd using Atomic – absorption (6601F) The mean value of lead (pb) concentration in p.p.m for the three location are 0.137, 0.222 and 4.490 for ALhadaba , Abosheba and Tripoli-zawia highway respectively ,also for cadmium (Cd) the main value is 0.075 , 0.097 and 0.027 p.p.m for ALhadaba, abushiba and Tripoli – zawia highway respectively. The contaminated by pb and Cd are degrease in agricultural location compared with Tripoli – zawia highway, this indicating the effect of the pb and Cd source especially automobile traffic

Poster Session (II)

Wednesday, 24th March, 2010
(11:00-19:30)

PP(II)-1

Controlling Metal/Semiconductor Junction Barrier by Phthalocyanine Organic Semiconductor

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We study how phthalocyanine at semiconductor/metal interface can affect electrical transport across the interface of the junction. Thin film of phthalocyanine organic semiconductor was prepared on p-type silicon by drop coating method. The Al/CuPc/p-Si structure demonstrated rectifying behavior by the current-voltage *(I-V)* curves studied at room temperature. The barrier height and ideality factor values were obtained as of 0.753 eV and 1.99 respectively. The diode shows a non-ideal behavior with an ideality factor greater than unity that could be ascribed to the interfacial layer, the interface states and the series resistance. The interface-state density has an exponential rise with bias from the midgap towards the top of the valence band. We conclude that phthalocyanine can control electrical transport of the conventional metal/semiconductor devices.

PP(II)-2

A Study Eletrical Properties and Crystallization Kinettics of Amorphous $Se_{100-X}In_X$ Films

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Amorphous $Se_{100-x}In_x$ thin films have been prepared by the flash evaporation technique (where x=10,20 and 30 at %). The DC Electrical conductivity of the films has been studied. The incorporation of *In* atoms in a *Se* matrix leads to an increase in the electrical conductivity and a decrease in the thermal activation energy of the films in the temperature range 300-430 K from 0.49 to 0.32 eV with increase *In* content. The change in the electrical conductivity with time during the amorphous-to-crystalline transformation is recorded for amorphous $Se_{100-x}In_x$ films at two points of isothermal temperatures 370 and 400 K. The results indicate that the micro-heterogeneous structures of the films have a remarkable influence on electrical conductivity during the amorphous to crystalline transition. The formal crystallization theory of Avrami has been used to calculate the kinetic parameters of crystallization.

PP(II)-3

Investigation of Structure and Magnetic Properties of $Ni_{0.5}Zn_{0.5}Cr_{0.1}Fe_{1.9}O_4$ Nanoparticles Prepared by Wet Methods

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Nanostructured ferrite of composition $Ni_{0.5}Zn_{0.5}Cr_{0.1}Fe_{1.9}O_4$ was prepared by sol-gel, co-precipition, citrate-gel, flash and oxalate precursor methods. X-ray diffraction patterns were carried out for all the samples to examine the purity of the phase of the spinel structure and to calculate the lattice parameters and the particle size. The values of the crystal size of the average of all peaks for different method were in nanometric size (19 – 55 nm). The saturation magnetization at room temperature were studied. The results are explained in terms of the relation between grain size and magnetic properties in addition to surface randomizing effect in nanocrystals leading to superparamagnetism state.

PP(II)-4

Controlling of Structural, Morphological and Optical Properties of Nanostructure Boron Doped ZnO Films by pH Effect

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The boron doped ZnO (ZnO:B) films have been deposited onto ITO coated glass substrates by the sol gel method using spin coating technique. Zinc acetate dehydrate (ZnAc), 2-methoxyethanol and monoethanolamine (MEA) were used as a starting material, solvent and stabilizer, respectively. Trimethyl borate (TMB) was used as a dopant source. The molar ratios of ZnAc and TMB to MEA was maintained at 1/1, 1/2, 1/3 and 1/4. The coating solution was dropped into ITO substrate, which was rotated at 3000 rpm for 30 s using a spin coater. After the spin coating process the film was dried at 300 ^{o}C for 10 min in a furnace. This coating/drying procedure was repeated for ten times, before the films were inserted into a tube furnace and annealed at 500 ^{o}C in air for 1 h. The pH value of the sol increased with increasing MEA and it changed from acid to base in nature. The pH was varied from 7.21 to 10.07 by adding varying amounts of MEA to the sol. In this study, it was investigated the effect of pH value on the structural, morphological and optical properties of the films. The crystalline structure of the ZnO films has been investigated using X-ray diffraction (XRD) study. Surface morphology of the films has been also analyzed by a field emission scanning electron microscope (FESEM). The important changes in surface morphology of the ZnO:B films were observed due to the pH values. For the optical transmittance measurements, we used a double beam spectrophotometer with an integrating sphere in the wavelength range 190–900 nm. The optical band gap values of these films were determined. The absorption edge shifted depending on the pH-values.

PP(II)-5

Environmental Impacts of Nanoparticles and Nanotechnology

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In the present work, the impact of nanotechnology in industry, medicine and water purification is discussed in the frame of beneficial applications. In addition, the risks of this technology is compared with those of other technologies & life practices. Furtherrmore, recommendations are suggested to minimize the nanotechnology hazard. For instance, studies regarding the life cycle of nano-products and specific mechanisms of fate and transport of nanostructures are needed. Ultimately, some sort of risk profile for nanostructures must be established in order to make a threshold decision regarding the need for specific regulations because nanotechnology is so unique compared to other manufacturing techniques. The establishment of an interdisciplinary centre (probably comprising several existing research institutions)is suggested to research the toxicity, epidemiology, persistence and bioaccumulation of manufactured nanoparticles and nanotubes as well as their exposure pathways, and to develop methodologies and instrumentation for monitoring them in the built and natural environment. A key role would be to link this center with regulators and maintain a database of center results, that interacts with those collecting similar information in Europe and internationally. One has to consider whether current methods are adequate to assess and control the exposures of individuals in laboratories and workplaces where nanotubes and other nanofibres may become airborne and review the adequacy of the regulation of exposure to nanoparticles. In addition it is of interest to consider in setting lower occupational exposure levels for manufactured nanoparticles as well as to review the current procedures relating to the management of accidental releases both within and outside the workplace.

PP(II)-6

New Organic Semiconductor Materials Based on 2-(4-chloro-1-naphtyloxy)-2-oxoethyl Methacrylate-2-(Dimethylamino)Ethyl Methacrylate Copolymer Containing Quaternary Salts

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Methacrylate based monomer, 2-(4-chloro-1-naphtyloxy)-2-oxoethyl methacrylate (ClNOEMA) was synthesized by reacting 4-chloro-1-naphtol with methacryloyl chloride in the presence of triethylamine(NR_3) at 0-5 ^oC. The free-radical initiated copolymerization of (ClNOEMA), with 2-(dimethylamino)ethyl methacrylate (DMAEMA) was carried out in 1,4-dioxane solution at 70 ± 1 ^oC using 2,2'-azobisisobutyronitrile (AIBN) as an initiator with different monomer-to-monomer ratios in the feed. These copolymers have been converted into a novel salts by reaction with the iodemethane. Quaternization of the copolymer was carried out using methyl iodide at 20 ^oC. In each case the alkyl halide/copolymer molar ratio was 1.0. Copolymer (0.25 g) was dissolved in THF (10 ml) and the alkyl halide was added to this solution at the appropriate reaction temperature. Quaternization of copolymer with iodemethane (MeI) was complete after refluxing in THF. The electrical conductivity properties of poly(CINOEMA-co-DMAEMA) doped with MeI for various quaternazition times have been investigated. The electrical conductivity of the poly (CINOEMA-co-DMAEMA) polymers increases with increase of temperature. The electrical conductivity of the poly(CINOEMA-co-DMAEMA) polymers was fitted by Arrhenius model: $\sigma = \sigma_o \exp[-(\Delta E/kT)]$. The poly (CINOEMA-co-DMAEMA) polymer doped for 15 min. shows the highest conductivity. It is evaluated that the electrical conductivity properties of the insulating poly (CINOEMA-co-DMAEMA) were improved using methyl iodide dopant and the prepared polymers are typical semiconductor material with obtained electronic parameters.

PP(II)-7

Electrical Characteristics of $Ag/SnO_2/nSi/Au$ Schottky Diodes

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Schottky contact formation on tin oxide thin films has been investigated to achieve a good, reliable, and reproducible Schottky contacts to n type SnO_2 of high barriers heights by effect of indium doping. The films deposited on n type silicon were prepared by ultrasonic spray pyrolysis technique. The configuration of the diodes is $Ag/SnO_2/nSi/Au$. The electronic parameters, ideal factor, the effective barrier, flat band barrier height, the series resistance, the saturation current density of the diodes were extracted from the current voltage (I-V), capacitance voltage (C-V) characteristics. The photocurrent and photoresistance were deduced in dark and light phase. The photoconductivity of the diodes increases with In doping. The obtained results indicate that the electrical and photosensing properties are tuned with In doping.

PP(II)-8

Organic Modification of Barrier Height of Metal-Semiconductor Junctions

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Organic semiconductors have been extensively investigated owing to their potential applications in various electronic devices. Thin film of poly(3-thiophene) was used as an interlayer for the organic modification of Al/p-Si Schottky diode. The ideality factor and barrier height of Al/p-Si/P_3HT/Ag diode were found to be 2.52 and 0.76 eV, respectively. The obtained barrier height of the studied diode is higher than that of conventional Al/p-Si diodes. This suggests that the barrier height of Schottky diode can be tuned by the organic modification. For such a diode, the contribution of space charge limited current and series resistances to the charge transport have to be taken into account in addition to thermionic emission.

PP(II)-9

Effect of Hydrogen Peroxide and Oxalic Acid on Electrochromic Tungsten Oxide Thin Film Prepared by ion Exchange Method

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There is a growing interest in the development of solid state electrochromic devices (ECD) for application in smart windows, large area displays and rear view mirrors due to their commercial and technological interest. Electrochromic WO_3 thin films have been prepared by easy cheap sol-gel method form Na_2WO_4 using ion exchange resin. The structure and morphology were investigated and the effect of additives, like, hydrogen peroxide and oxalic acid are studied. The addition of hydrogen peroxide led to open porous structure and increased the diffusion coefficient from $5.29529E^{-14}$ to $3.05284E^{-09}$ by adding 1% and 4% volume ratio of hydrogen peroxide and oxalic acid respectively.

PP(II)-10

Optical Properties of $(CdO)_x(ZnO)_{1-x}$ with Variable Composition Grown by Spray Pyrolysis

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Composite cadmium oxides-zinc oxides, $(CdO)_x(ZnO)_{1-x}$, thin films are grown with variable composition, x, by non-conventional spray pyrolysis technique from two separate cavities. X-ray diffraction proves the formation of cadmium and zinc peroxides upon deposition. Further annealing in air causes a loss of crystallographic order in zinc oxide grains. Annealing does not affect the structure of cadmium peroxides. The optical constants are derived by the Murmann's exact equation from transmittance and reflectance in the wavelength range between 400 and 2400 nm and shows normal dispersion. Highest luminescent yield is assigned for samples with composition factor x = 0.5. Thermal annealing causes increase in luminescence yield of $(CdO)_x(ZnO)_{1-x}$ is that could be explained in the framework of structural change.

PP(II)-11

Noise Performance of Semiconductor Lasers Under Intensity Modulation

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The behavior of semiconductor lasers under high-speed modulation is attractive for both study and applications. Both the turn-on time delay of photon emission and quantum noise may induce inconsistence of the laser signal with the exciting electrical signal depending on the modulation parameters. Forms of inconsistence include pulsation, signals with period doubling, and chaos under analog modulation, whereas they include fluctuations of the turn-on edge and power level under digital modulation. These nonlinear dynamics happen to deteriorate noise performance of the laser and its applications. Determining noise properties associated with modulation is necessary to help laser-based system designers to choose operation conditions with optimum noise performance. In this work, the semiconductor laser noise under high speed analog and digital modulation is studied. In the former, the noise is measured in terms of the Fourier spectrum of the relative intensity noise (RIN), while it is measured by the Q-factor of the laser signal and bit error rate (BER) in the latter. The study is based on large-signal analysis of the laser rate equations. We examine dependencies of laser noise on modulation performance; namely, bias current, modulation current and modulation frequency (bit rate). Under analog modulation, laser dynamics are classified into six types with distinct dynamic characteristics in both the time and frequency domains. The GHz components of RIN are found to be higher when the laser output has discontinuous pulses than when it varies continuously with the time variation. Under digital modulation, the dynamic response of semiconductor lasers is examined qualitatively by the eye diagram. We investigate influence of the transmission bit rate on BER of fiber communication systems and the associated power penalty while fixing the fiber length. The relative contributions of the transmitter noise and the circuit and shot noises of the receiver to BER are quantified as functions of the transmission bit rate.

PP(II)-12

Structural, Electrical Properties and Transport Mechanism of CdTe Nanocrystalline

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In this work, a stoichiometry CdTe nano-structured powder was synthesized by chemical process. The structure of CdTe nanocrystalline was investigated by means of X-ray diffraction (XRD) technique, transmission electron microscopy (TEM) and EDAX (Energy-Dispersive X-ray Analysis). The selected area electron diffraction (SAED) study confirms the crystalline structure of the CdTe nanocrystalline. Some structural parameters such as the mean crystallite size and the internal lattice strain were calculated. Dc and ac electrical conductivity were measured at different temperatures. Conduction mechanism under dc and ac fields were interpreted. Also, The electronic parameters were determined.

PP(II)-13

Preparation of Dilute Magnetic Semiconductors Based on ZnO in Nanoparticle Form

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Nanoparticle system of composition $Zn_{1-x}Ni_xO$ was prepared in Nanosize style by co-precipitation method. The value of x lies between 0.01 and 0.1. X ray diffraction patterns and TEM were obtained. The obtained results reveal that the obtained structure is wurtzite and the prepared samples exhibit rod shape. The particle size was estimated by Sherrer equation and PAL (Positron Annihilation Lifetime) Spectroscopy. FTIR spectrum were obtained and analyzed.

PP(II)-14

Conduction Studies on Evaporated Cadmium Sulphide Thin Films

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CdS thin films were prepared by thermal evaporation technique under vacuum onto glass substrates at different substrate temperatures with different gaps. The structure of the films was confirmed using X-ray diffraction (XRD). The deposited films were found to be crystalline structure. The electrical properties were found to depend on the substrate temperatures. A significant increase of resistivity from 10^3 to 10^7 Ωm and space-charge-limited current were observed in CdS films evaporated by vacuum evaporation. Ohmic behavior was detected at low voltage, on the other hand the space charge limited current (SCLC) was notice at high voltage. The transition voltage (V_t) was varied with substrate temperatures and the distance of the gaps.

PP(II)-15

Physical and Optical Properties of Amorphous $Ge_xAs_{20}S_{80-x}$ Thin Films

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The present paper reports the effect of replacement of sulfur by germanium on the optical constants and some other physical parameters of chalcogenide $Ge_xAs_{20}S_{80-x}$ (where x = 0, 5, 10, 15 and 20 at. %) thin films. Increasing germanium content is found to affect the average heat of atomization, the average coordination number, the number of constraints and the cohesive energy of the studied system. Films with thickness 800-820 nm of $Ge_xAs_{20}S_{80-x}$ were prepared by thermal evaporation of the bulk samples. The transmission spectra, $T(\lambda)$, of the films at normal incidence were obtained in the spectral region from 400 to 2500 nm. A straightforward analysis proposed by Swanepoel, based on the use of the maxima and minima of the interference fringes, has been applied to derive the real and imaginary parts of the complex index of refraction and also the film thickness. Optical absorption measurements showed that the fundamental absorption edge is a function of composition. The optical absorption is due to allowed non-direct transition and the energy gap decreases while the refractive index increases with the increase of germanium content. The chemical-bond approach has been applied to obtain the excess of S-S homopolar bonds and the cohesive energy of the $Ge_xAs_{20}S_{80-x}$ system.

PP(II)-16

Optical Behavior of Nd doped Borocromate Glassy System

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Glassy system of composition 74 b_2o_3-(25-x)li_2o-xcr_2o_3-$Nd2o_3$, Where x=0, 0.1, 0.2, 0.3, 0.4, 0.5 mol.%. Has been prepared by conventional melt quenching technique the density has been estimated and the molar volume was calculated. The obtained data reveal that, both density and molar volume are almost composition independent. Optical absorption spectra were recorded and the optical gap energy and the band tail width have been obtained. It was observed that, the band gap decreases with increasing cr_2o_3 content, while as the band tail width follow opposite trend.

PP(II)-17

Dispersion Behavior of AC Electrical Conductivity and Dielectric Constant of $Zn_{0.5}Cu_{0.5}Fe_2O_4$ Ferrite

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A polycrystalline spinel ferrite with $Zn_{0.5}Cu_{0.5}Fe_2O_4$ composition was prepared by the usual ceramic technique. X-ray diffraction studies of the structure confirm the formation of a single cubic spinel phase. The effect of temperature and frequency on impedance, dielectric constant and dielectric loss of these ferrites is studied and the results are discussed. At low and high frequency, the conduction mechanism in these ferrites is explained basing on the space charge polarization and the hopping conduction mechanisms. The abnormal behavior of the dielectric constant with frequency is explained on the basis of Rezlescu and Rezlescu model. The dielectric loss showing peaking behavior at frequencies coincide with the hopping frequency of the electrons exchange between Fe^{2+} and F^{3+} ions. The two relaxation peaks of the imaginary parte of the impedance were assigned to the low and high dispersion regions of the ac conductivity.