

# DR. BASHAR LAHLOUH

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## EDUCATION

- Ph.D. in Physics. Texas Tech University, Lubbock, Texas, U. S. A, 2000 – 2003.
- M.Sc. in physics. Texas Tech University. Lubbock, Texas, U. S. A, 1999 – 2000.
- Bachelor of Science in Physics. The University of Jordan, Amman – Jordan, 1991 – 1995.

## RESEARCH EXPERIENCE

- **Played Major Role** in Founding Advanced Research Facility (Advanced Performance Materials Laboratory), Physics Department, Faculty of Science, The University of Jordan (2007 – Up to Date).
  - Operating Equipment in Lab:
    - Atomic Force Microscope (AFM).
    - Advanced Polarizing Microscope.
    - Advanced thin film analysis Tool (FilmTek).
    - Luminescence Spectrophotometer (UV-Vis PL).
    - Differential Scanning Calorimeter (DSC)
    - Spin Coater.
    - Various high temperature furnaces, vacuum ovens, hot stages, hot press, very sensitive balances, tools, etc.
    - SCT-1800 Physical Vapor Deposition system (PVD).
    - Shimadzu X-Ray Diffraction Machine (XRD).

**Active research is currently being conducted in the above-mentioned labs in various aspects of science including synthesis and characterization of various materials including low-k materials, conductive polymers, CuInSe<sub>2</sub>, CdSe, ZnS for solar-cell applications, luminescent materials.**

- **Research Assistant.** Texas Tech University Lubbock, Texas, U.S.A. 1999 – 2003.  
As a research assistant, the following was part of this job:

- \*Development of nanoporous low-k  $\alpha$ -SiC/SiO<sub>2</sub>/C:H films with dielectric constant as low as 2.1.
- \*Development of effective treatment methods for dielectric constant recovery of plasma damaged nanoporous low-k organosilicate films.
- \*Design and construction of a supercritical carbon dioxide system for semiconductors applications.
- \*Application of supercritical carbon dioxide for selective extraction of CO<sub>2</sub> soluble components to produce nanoporosity in organosilicate films.
- \*Design and development of a flow-through and pulsed supercritical carbon dioxide system.
- \*PECVD deposition of nanocrystalline SiC thin films.
- \*PECVD development and deposition of multiphase organosilicate films for nanoporous low-k application.
- \*Design and implementation of MEMS micropumps, micro channels, waveguides and micro moisture sensors.

## ACADEMIC EXPERIENCE

- **Professor of Physics**, Physics Department, Faculty of Science, The University of Jordan, Amman, Jordan, 18/6/2019 – present.
- **Associate Professor of Physics**, Physics Department, Faculty of Science, The University of Jordan, Amman, Jordan, 17/12/2012- 18/6/2019.
- **Assistant Professor of Physics**, Physics Department, Faculty of Science, The University of Jordan, Amman, Jordan, September 2004 – 17/12/2012.
- **Assistant Professor of Physics**, The Prince Hussein Bin Abdullah II Academy of Civil Protection, Amman, Jordan, Fall 2009/2010.
- **Assistant Professor of Physics**, Physics Department, Faculty of Science, The Applied Science University, Amman, Jordan, March 2004 - September 2004.
- **Teaching Assistant**, Texas Tech University. Lubbock, Texas, U. S. A, 1999 – 2001. Assignments included teaching Advanced Semiconductor Processing class in addition to introductory classes in Physics.

## COURSES & TEACHING:

- Physics 101 and 102: general physics for science and engineering students.
- Physics 103 and 105: general physics for life sciences and medicine students.
- Modern physics for physics major students.

- Quantum mechanics for physics major students.
- Optics for physics major students.
- Introduction to circuits for computer science students.
- Electronics for physics and materials science students.
- Digital Electronics for physics major students.
- Electricity and magnetism for physics major students (both undergraduate and graduate levels).
- Semiconductor Physics for physics and materials science students.
- Thermal Physics for physics major students.
- Special Topics for graduate students: spectroscopy.
- Advanced Physics Labs for physics major students.

## Management EXPERIENCE

- ABET accreditation team leader and member 2015 -2024.
- Chairman of Physics, The University of Jordan, 7/2017 – 9/2017.
- Chairman of Physics, The University of Jordan, 9/2018 – 9/2020.

## ATTRIBUTES

- Self-motivated, enthusiastic, and accustomed to hard work and responsibility.
- Devoted, determined, and have a great deal of energy to exert at work.
- Technically oriented with a strong academic background.
- Adapt quickly to changing situations, while grasping and implementing new concepts.
- Team Leader and team Player with demonstrated ability to work well with people at all levels.

## MASTER STUDENTS

- 1) Student's Name: **Bara'a Mahmoud Al-Khalayleh** (supervisor)  
Thesis Title: "Optical Properties Of Iodine Doped Poly(ethylene oxide)"  
Graduated: Oct.2009
- 2) Student's Name: **Eman Salem Al-howeitat** (supervisor)  
Thesis Title: "Optical properties of copper indium diselenide (CuInSe<sub>2</sub>) thin films prepared by physical vapor deposition method"  
Graduated: Nov./2010
- 3) Student's Name: **Mohammad Khalil Al-Shahatit** (co-supervisor)

Thesis Title: “Optical properties of metal doped titanium oxide films prepared by sol-gel spin coating technique”

Graduated: Dec.2010

- 4) Student’s Name: **Taqwa Jamal K. Aqel** (supervisor)

Thesis Title: “Optical and Structural Properties of Undoped Cadmium Selenide Thin Films Deposited by Electron Beam Method”.

Graduated: Sep. 2012

- 5) Student’s Name: **Aminah Toursun Eniyazi** (supervisor)

Thesis Title: “Optical and Structural Properties of Cerium Doped Polycarbonate Thin Films”

Graduated: November 2017

- 6) Student’s Name: **Ola Mahmoud Ali Saed** (supervisor)

Thesis Title: “Optical and Luminescence Properties of Europium Doped Polycarbonate Thin Films”

Graduated: November 2017

- 7) Student’s Name: **Sana’a Kamel Al-Far** (supervisor)

Thesis Title: “Properties of Rechargeable Sodium-Ion Batteries Based on NASICON ( $\text{NaZr}_2\text{Si}_2\text{PO}_{12}$ ) Electrolyte Prepared by Sol-Gel Method”

Graduated: July 2019

- 8) Student’s Name: **Hanadi Jihad Mahmoud** (supervisor)

Thesis Title: “The Optical and Performance Properties of Highly Efficient Perovskite Solar Cells with  $\text{SnO}_2/\text{MgO}$  Composite Electron Transport Layers”

Graduated: July 2020

## **MEMBERSHIPS, COMMITTEES & REFEREEING**

- Refereeing physics papers for local and international journals.
- **Blossom’s Initiative for Blended Learning Team / Member**, Massachusetts Institute of Technology, Cambridge, MA, U.S.A, February 2008 – up to date”.
- **Materials Science and Technology Program / Founding Committee / Member**, Department of Physics, Faculty of Science, The University of Jordan, Amman, Jordan.
- **Characterization Tools/Apparatus Committee / Member**, Faculty of Science, The University of Jordan, Amman, Jordan, Academic Year 2008/2009.

- **Graduate Qualifying Exam Committee / Member**, Department of Physics, Faculty of Science, The University of Jordan, Amman – Jordan.
- **Undergraduate Qualifying Exam Committee / Member**, Department of Physics, Faculty of Science, The University of Jordan, Amman, Jordan.
- **Several Graduate Student Thesis Defense Committees / Supervisor / Co-supervisor / Member**, Department of Physics, Faculty of Science, The University of Jordan, Amman, Jordan.
- **ABET Accreditation Committee head and team leader** for the physics department accreditation.
- **Labs Committee Member and Lab Manual coauthor** for introductory physics lab 111 and for the advanced physics labs at The University of Jordan.
- **Seminar Committee Member** at the department of physics.

## PUBLICATIONS & PRESENTATIONS

- **“Effects of Etching Solution Concentration on Silicon Surface Reflectivity as a Solar Cell Surface Modifier”**  
Ammar Mahmoud Al-Husseini, **Bashar Lahlouh** (Accepted Manuscript, JJP) (2024).
- **“Performance Comparison and Light Reflectance of Al, Cu, and Fe Metals in Direct Contact Flat Solar Heating Systems”**  
E AlShamaileh, IS Moosa, H Al-Fayyad, **B Lahlouh**, HA Kazem, ...  
Energies 15 (23), 8888, (2023)
- **“Exposure to Aerosols Emitted from Common Heating Combustion Sources Indoors—The Jordanian Case as an Example for Eastern Mediterranean Conditions”**  
T Hussein, O Al-Jaghbeer, N Bqour, B Zidan, **B Lahlouh**  
Atmosphere 13 (6), 870 (2022)
- **“Optical polarizability of erbium-oxygen complexes in sol-gel-based silica films”**  
S. Abedrabbo, B. Lahlouh, A.T. Fiory, N.M. Ravindra, Journal of Physics D: Applied Physics 54 (13) (2021), 135101
- **“Effect of Sn content on some optical properties of Se<sub>90</sub>Pb<sub>10-x</sub> thin films”**, EO Hawarat, MMA Imran, OA Lafi, HK Juwhari, BI Lahlouh, N Chandel, ...Optical Materials 100 (2020), 109672
- **“Structural and Light Trapping Properties of Nanoporous Silicon Micro Pyramid Patterns Encrusted with Silver Nanoparticles”**,

**Bashar Lahlouh**, Ammar Al-Husseini, Aminah Eniyazi

Applied Nanoscience 10 (2020),117-126, DOI: 10.1007/s13204-019-01054-w

- **“Influence of pyramid size on reflectivity of silicon surfaces textured using an alkaline etchant”**, AMMAR MAHMOUD AL-HUSSEINI, **BASHAR LAHLOUH**, Bull. Mater. Sci., 42, (2019), 152.
- **“Influence of the Deposition Temperature on the Structure, Morphology, and Optical Properties of Thermally Evaporated CdTe Thin Film”**. SHADIA J. IKHMAIYES, SUFIAN ABEDRABBO, and **BASHAR LAHLOUH**, Journal of Electronic Materials, 48(2019), 6901-6909
- **“Properties of ZnO Micro/Nanostructures on Aluminum Substrates”**. Shadia J. Ikhmayies, Hassan K. Juwhari and **Bashar Lahlouh**, Characterization of Minerals, Metals, and Materials 2019 pp 237-246.
- **“Accumulation and Coarse Modes Aerosols Concentrations and Carbonaceous Contents in the Urban Background Atmosphere in Amman – Jordan”**. Hussein T, Juwhari H, Al Kuisi M, Alkattan H, **Lahlouh B**, Al-Hunaiti A. Arabian Journal of Geosciences 11, 617, 2018
- **“Purification and biochemical characterization of photo-active membrane protein bacteriorhodopsin from *Haloarcula marismortui*, an extreme halophile from the Dead Sea”**, Diya Alsafadi, Fawwaz I. Khalili, Hassan Juwhari, Bashar Lahlouh, International Journal of Biological Macromolecules, 118 (B), 1942, 2018.
- **“Silicon Pyramid Structure as a Reflectivity Reduction Mechanism”** Ammar Mahmoud Al-Husseini and **Bashar Lahlouh**, J. Applied Sci., 17 (8): 374 -383, 2017
- **“The  $\gamma$ -irradiation Effect on the Optical Properties of CdTe Thin Films Deposited by Thermal Evaporation Technique”** Feras Afaneh, Mohammad Okasha, Khalil J. Hamam, Adel Shaheen, Mufeed Maghrabi, **Bashar Lahlouh**, Hassan K. Juwhari, Materials Science (MEDZIGOTYRA), Volume 24, No.1, 3-9, 2018.
- **“Room Temperature Photoluminescence of Spray-Deposited ZnO Thin Films on Glass Substrates”** H. Al-Jawhari, S. Ikhmayis, **B. Lahlouh**, International Journal of Hydrogen Energy, 42 (28), 14741-14747 (2017).
- **“Magnetic properties and hyperfine interactions in M-type BaFe<sub>12-2x</sub>MoxZnxO<sub>19</sub> hexaferrites”**SH Mahmood, GH Dushaq, I Bsoul, M Awawdeh, HK Juwhari, **BI Lahlouh**, ...Journal of Applied Mathematics and Physics 2 (05), 77 (2014).

- **“Effects of Molybdenum Concentration and Valence State on the Structural and Magnetic Properties of  $\text{BaFe}_{11.6}\text{Mo}_x\text{Zn}_{0.4-x}\text{O}_{19}$  Hexaferrites”**  
Dushaq G. H. ; Mahmoud S. H. ; Bsoul I.; Juwhari H. K. ; **Lahlouh, B** ; AlDamen M. A.  
ACTA METALLURGICA SINICA (ENGLISH LETTERS (2013) Volume: 26 Issue: 8 Pages: 509-516.
- **“AC electrical and optical characterization of epoxy- $\text{Al}_2\text{O}_3$  composites”**  
Al-Bayer, R ; Zihlif, A ; **Lahlouh, B** ; Elimat, Z ; Ragosta, G  
JOURNAL OF MATERIALS SCIENCE-MATERIALS IN ELECTRONICS (2013) Volume: 24 Issue: 8 Pages: 2866-2872.
- **“Annealing effects on the optical properties of europium-doped tin oxide thin films prepared by electron-beam evaporation”** Dirasat, Pure Sciences, Volume 39, No.1, 2013 **B. I. Lahlouh**, H. K. Juwhari, M. H. Kailani.
- **“Infrared photoluminescence of sol-gel spin-coated films of rare-earth activated lanthanum silicate”** *Materials Letters* **87** (2012), H.K. Juwhari, M.H. Kailani, **B.I. Lahlouh**, S.A. Abedrabbo, K.A. Saleh, W.B. White.
- **“Analytical study of thermal annealing behaviour of erbium emission in  $\text{Er}_2\text{O}_3$ -sol-gel silica films”** *Journal of Physics D: Applied Physics* **44** (2011), Abedrabbo, S., **Lahlouh, B.**, Fiory, A.T.
- **“Room-temperature silicon band-edge photoluminescence enhanced by spin-coated sol-gel films”** *Scripta Materialia*, Volume 65, Issue 9, November 2011, Pages 767-770 S. Abedrabbo, **B. Lahlouh**, S. Shet, A.T. Fiory
- **“Ellipsometric characterization of  $\text{PbI}_2$  thin film on glass”** *Physica B* 404 (2009) A. Ahmad, S. Saq'an, **B. Lahlouh**, M. Hassan, A. Alsaad and H. El-Nasser.
- **“Hexamethyldisilazane vapor treatment of plasma damaged nanoporous methylsilsesquioxane films: Structural and electrical characteristics”**  
*Thin Solid Films*, 3399 – 3404, 516 (2008). T. Rajagopalan , **B. Lahlouh** , I. Chari a, M.T. Othman ,N. Biswas , D. Toma , S. Gangopadhyay.
- **“Low-k organosilicate films prepared betravinyltetramethylcyclotetrasiloxane,”** J. Lubguban, T. Rajagopalan, N. Metha, B. Lahlouh, *J. Appl. Phys.*, 92 (2002),1033.
- **“Supercritical Carbon Dioxide Process for Forming Nanoporous Dielectrics,”** S. Gangopadhyay, J. Lubguban, T. Rajagopalan, B. Lahlouh, International Sematech/ Ultra low k workshop 2002.
- **“Investigation on hexamethyldisilazane vapor treatment of plasma-damaged nanoporous organosilicate films”** *Applied Surface Science*, 2006, vol. 252, no. 18,

pp.6323 - 6331 T. Rajagopalan, **B. Lahlouh**, J.A. Lubguban, N. Biswas, S. Gangopadhyay, J. Sun, D.H. Huang, S.L. Simon, D. Toma and R. Butler.

- **“Supercritical CO<sub>2</sub> extraction of porogen phase: An alternative route to nanoporous dielectrics”**. Lubguban, J. A.; Gangopadhyay, S.; Lahlouh, B.; Rajagopalan, T.; Biswas, N.; Sun, J.; Huang, D. H.; Simon, S. L.; Mallikarjunan, A.; Kim, H.-C.; Hedstrom, J.; Volksen, W.; Miller, R. D.; Toney, M. F. *Journal of Materials Research* (2004).
- **“Ferrihydrite gels derived in the Fe(NO<sub>3</sub>)<sub>3</sub>·9H<sub>2</sub>O-C<sub>2</sub>H<sub>5</sub>OH-CH<sub>3</sub>CH<sub>2</sub>O ternary system”**. Talantsev, Evgueni F.; Pantoya, Michelle L.; Camagong, Cristina; Lahlouh, Bashar; Nicolich, Steven M.; Gangopadhyay, Shubhra. *Journal of Non-Crystalline Solids* (2005).
- **“Post treatment of plasma-enhanced chemical vapor deposited a-SiC:H films for low-k dielectrics.”** B. Lahlouh, T. Rajagopalan, N. Biswas, J. Sun, D. Huang, S.L. Simon, J.A. Lubguban, Shubhra Gangopadhyay. *Thin Solid Films* 497 (1-2): 109-114 Feb, 21 2006.
- **“Silylation Using a Supercritical Carbon Dioxide Medium to Repair Plasma-Damaged Porous Organosilicate Films”** B. Lahlouh, J. A. Lubguban, G. Sivaraman, R. Gale, and S. Gangopadhyay *Electrochem. Solid-State Lett.* **7**, G338 (2004).
- **“Use of SCCO<sub>2</sub> Processing for Integration and Formation of Ultra Low-k Dielectrics,”** D. Toma, M. Biberger, R. Butler, J. Sun, T. Rajagopalan, B. Lahlouh, *International Sematech / Ultra low k workshop* 2002.
- **“Novel Method for Producing Nanoporous Dielectric Films,”** B. Lahlouh, X. Wang, N. Metha, S. Gangopadhyay, *MRS Fall meeting* 2000. (Symposium L).
- **“Supercritical CO<sub>2</sub> Process for Porous Materials and Clean,”** B. Lahlouh, S. Gangopadhyay, *SRC Center for Advance Interconnect Systems Technologies Review Meeting*, RPI 2002.
- **“Supercritical carbon dioxide extraction to produce low-k plasma enhanced chemical vapor deposited dielectric films,”**J. A. Lubguban, J. Sun, T. Rajagopalan, B. Lahlouh. *Appl. Phys. Letters*, 81, 4407 (2002).
- **“Supercritical carbon dioxide extraction of porogens for the preparation of ltralow-dielectric-constant films”** Rajagopalan, T, Lahlouh, B, Lubguban, JA, et al. *APPL PHYS LETT* 82 (24): 4328-4330 JUN 16 2003.
- **“A two-stage discrete peristaltic micropump”** Berg, JM; Anderson, R; Anaya, M; Lahlouh, B; Holtz, M; Dallas, T *SENSOR ACTUAT A-PHYS* 104 (1): 6-10 MAR 15, 2003.

- **“Creating Nanoporosity By Selective Extraction Of Porogens Using Supercritical Carbon Dioxide/Cosolvent Processes”** B. Lahlouh, T. Rajagopalan, J. A. Lubguban et al. MRS Spring Meeting 2003, April 22-24 2003, San Francisco, CA.

## HONORS & AWARDS

- Grants for Research & Development (\$80,000), Deanship for academic research, University of Jordan, Amman, Jordan, 2006 – 2012.
- KAFD grant for creative undergraduate student (\$7000), 2017.
- Graduate Assistantship, Texas Tech University, TX, USA

## COMPUTER SKILLS

- Operating Systems: DOS and Windows.
- Program Packages: Microsoft Office; Originlab; Mathematica, Mathcad, Maple, and Multisem.

## REFERENCES

- **Prof. Shubhra Gangopadhyay**  
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Electrical and Computer Engineering Department  
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