

Curriculum Vitae



Ibrahim M. Odeh,
Ph.D. in Physics
Associate Professor

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Education:

- 1982 Ph.D. Physics, Heriot-Watt University, Edinburgh, UK.
 - 1978 M.Sc Physics, University of Glasgow, UK,.
 - 1972 B.Sc. Physics, University of Mosul, Iraq,
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Theses Titles:

- M. Sc. Thesis: Optical properties of magnesium-bismuth alloys.
 - Ph. D. Thesis: A structural and spectroscopic study of glow-discharge Hydrogenated amorphous silicon (a-Si: H).
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Languages:

- Arabic: mother tongue
 - English: excellent reading, writing, and conversation
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Awards and Scholarships:

1. UNRWA scholarship to study for B. Sc degree, Mosul University, '68-'72.
 2. British Council, fees award for PhD degree, Heriot-Watt University, Edinburgh, '79-'81.
 3. EC award, for a research visit to Heriot-Watt University, Edinburgh, Summer 1987.
 4. British Council award for a research visit to Heriot-Watt University, Edinburgh, Summer 1989.
 5. Deutscher Akademischer Austauschdienst (DAAD), for a research visit to Erlangen-Nurmburg University, Germany, Summer 1996.
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University Courses Taught:

1. Undergraduate:
 - General physics: Mechanics, Electricity and Magnetism, Waves and Light, Physics for Medical and Pharmaceutical Sciences.
 - Mathematical physics, Modern physics, Electronics, Theory of Relativity,
 - Solid State Physics, Quantum Mechanics, Geometrical Optics, Physical optics, Astronomy, and Spectroscopy.

2. Postgraduate:

- Special topics in the physics of amorphous solid thin films (metallic, dielectric, and semiconductors).

Professional Experience:

- Physics and science teacher: Jordan 1972 -1974, and Libya 1974-1975.

Teaching Assistant:

- Glasgow University, Glasgow, UK 1975-1977
- Heriot-Watt University, Edinburgh, UK 1978-1980
- Research Associate: Heriot-Watt University, Edinburgh, UK 1981-1982
- Post-Doctoral Research Associate: Heriot-Watt University, Edinburgh, UK 1982-1983

Assistant Professor:

- Yarmouk University, Irbid, Jordan 1983-1987
- College of Technological Studies, Kuwait 1987-1990 (on leave)
- Yarmouk University, Irbid, Jordan 1990-1996
- Ajaman University 1996-1997 (sabbatical)
- Yarmouk University, Irbid, Jordan 1997-2007

Associate Professor:

- Yarmouk University, Irbid, Jordan 2007- to date

Research Interests:

1. Physics of amorphous thin films and their applications.
2. Preparation and characterization of amorphous alloys and compounds.
3. Basic research in the physical properties (electrical, magnetic, optical, and structural) of solid thin films.
4. Applications of thin film in photovoltaic devices (solar cells), optical devices, gas sensors, microelectronics, catalysis, and anti-corrosion coatings.
5. Ion beam assisted deposition (IBAD) of thin Films.
6. Fabrication and characterization of nano-materials and nano thin films.
7. Preparation and characterization of thin films by pulsed laser ablation.
8. Applications of Physical methods, RF sputtering and Ion beam sources, in archeology and restoration of artifacts.
9. Applications of nano-materials and nano thin films in archeological objects and restoration of artifacts (new).

Research Experience:

Extensive Experience in

1. Preparation techniques of thin films, thermal evaporation, and electron beam deposition, DC and RF sputtering, ion beam assisted deposition (IBAD).
2. Preparation of nano-materials by high-energy ball milling.
3. Characterization of thin films (electrical, optical, and structural methods).
4. Vacuum systems, construction, and instrumentation.
5. Design of apparatus and accessories relevant to thin film research.

6. X-ray powder diffraction, scanning and transmission electron microscopy (SEM and TEM), infrared and FTIR spectroscopy.

Glasgow University, Glasgow, UK (1976-1978)

- Preparation of amorphous magnesium-bismuth (Mg-Bi) alloys in thin film form by thermal co evaporation at liquid nitrogen (LN) temperature.
- Determination of the optical constants of the Mg-Bi alloy thin films in situ at LN temperature.
- Measurements of DC conductivity as a function of temperature in the range of 77-300 K

Heriot-Watt University, Edinburgh, UK (1978-1983)

- Preparation of hydrogenated amorphous silicon, a-Si: H, by the glow-discharge of silane (SiH₄) and other doping gases for p-type and n-type semiconductors.
- Determination of optical properties in the UV-visible range.
- Determination of the infrared vibration modes (stretching, bending and wagging or rocking) of a-Si: H in the infrared range of 4000-200 cm⁻¹.
- Scanning Electron Microscopy study of annealed films of a-Si:H in situ.
- Studying of infrared spectra of thermally dehydrogenated a-Si:H films.
- Studying of infrared spectra of chemically produced Si:H before and after oxidation.
- FTIR spectroscopy.

Yarmouk University, Irbid, Jordan (1983- to date)

- Establishment of a research laboratory for studying the physics and technology of amorphous thin films in the Physics Department. The lab contains preparation facilities including thermal coating system (Edwards E360) with electron beam source and magnetron sputtering accessories and home made ion beam sources. The Lab is equipped with various instruments for film characterization including a UV-Visible spectrophotometer and a Philips X-ray Diffractometer. There is also, a home made High Vacuum Furnace with a graphite cavity.
- In addition to supervision of postgraduate (M. Sc.) students.

Additional professional activities:

Supervision of postgraduate students for MSc. degree in physics.

Direct Supervisor:

Direct supervisor to the following MSc students and theses:

1. Ibrahim Jassim Abdullah Al-Falahie
 - a. Thesis Title: Optical Properties of Amorphous
 - b. a-Si: C: H Thin Films and Photo-Induced Structural Changes.
 - c. August 1992.
2. Kawther Shatnawi
 - a. Thesis Title: Electrical and Optical Properties of Amorphous Tin Oxide Thin Films. July 1994.
3. Ziad Abu-Waar

- a. Thesis Title: Electrical and Optical Properties of Amorphous Zinc Oxide Thin films. August 1997
- 4. Hasan A. Hadi Al-Mosawi
 - a. Thesis Title: Optical Properties of Tin Nitride.
 - b. December 1999
- 5. Husam Aldin A. M. Abu Matar
 - a. Thesis Title: Determination of Optical Constants of Single Layer Thin Film from Transmittance and Reflectance Measurements at Normal Incidence of Light. Theoretical and Experimental Approach.
 - b. May 2000

Examiner for M.Sc Theses:

Internal and external examiner of MSc theses at Yarmouk University and University Of Jordan.

1. A. Alsharif, The Design of Optical Filters Using Dielectric Thin Films. Yarmouk University (1991).
2. Bothina Hamad, Transmissivity of bilayer (Metal-Semi-metal) thin film systems. Physics Department, University of Jordan, 1995.

I have also refereed several journal articles.

Membership of a number of departmental committees:

1. Higher Studies Committee at the physics Department
2. Laboratory and Technical Committee at the physics Department

Professional and Scientific meetings:

1. 7th International Conference on Liquid and Amorphous Semiconductors, Edinburgh University, (UK) 1977. Presented a paper #1 in list of publications.
1. 8th International Conference on Liquid and Amorphous Semiconductors, Harvard University, Boston, MA, (USA) 1979. Presented a paper #2 in the list of publications.
2. International Symposium on the Physics of Amorphous and Applications of Amorphous Silicon ICTP, Trieste (Italy) 1980. Presented a paper entitled "Blistering of hydrogenated amorphous silicon".
3. 9th International Conference on Liquid and Amorphous Semiconductors, University of Grenoble, Grenoble (France) 1981. Presented a paper #10 in the list of publications.
4. Annual meetings on liquid and amorphous semiconductors; Chelsea, London (1978, 1979, 1980, 1981).
5. First Workshop on amorphous materials, Yarmouk University, Irbid, Jordan (1985). Sponsored by UNESCO. Organization committee chaired a session.
6. First International Conference on the Physics of Condensed Matter, Jordan University, Amman, Jordan (1986). Sponsored by UNESCO. Organization committee, chaired a session, presented a paper entitled "Infrared spectra of hydrogenated amorphous silicon".
7. Research visit to Heriot-Watt University, Edinburgh, UK, 1987; sponsored by the EC commission in Jordan
8. Research visit to Heriot-Watt University, Edinburgh, UK, 1989 sponsored by the British Council in Kuwait.

9. The XX conference on solid-state science and workshop on new materials, Luxor, Egypt November 1997.
 10. Member of the National Jordanian liaising Committee for the 45th International Field Emission Symposium. September 12-18, 1998. Jordan University of Science and Technology (JUST), Irbid, Jordan.
 11. Sixth Petra School of Physics at Yarmouk University, 1998
 12. Forth-Conference on Condensed Matter Physics at the University Of Jordan. May 2000.
 13. Second regional conference on magnetic and superconducting materials at Yarmouk University, 2001.
 14. First Symposium on Use of Nuclear Techniques in Environmental Studies, 2001.
 15. Second Symposium on Use of Nuclear Techniques in Environmental Studies, 2002.
 16. Third Symposium on Use of Nuclear Techniques in Environmental Studies, 2003.
 17. Fourth Symposium on Use of Nuclear Techniques in Environmental Studies, 2004.
 18. First Intrnational Conference on materials in Jordan, German-Jordan University, 2009.
 19. Several meetings and conferences held in Jordan during the last several years.
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List of Research Papers Published (recent):

1. I. M. Odeh, "Optical Characteristics of Amorphous Tin Nitride Thin Films Prepared by Ion Beam Assisted DC Magnetron Reactive Sputtering". *Jordan Journal of Physics*, Volume 1, Number 1, (2008) pp. 19-29.
2. Ibrahim M. Odeh, Abdel-Fatah D Lehlooh, and Sami H. Mahmood, "X-Ray Diffraction And Mössbauer Spectroscopy of High Energy Ball-Milled Fe₂O₃ /TiO₂ Composite powders". *Hyperfine Interact* (2008) 183: 25-29.
3. I. M. Odeh, "Fabrication and optical constants of amorphous copper nitride thin films prepared by ion beam assisted dc magnetron reactive sputtering". *Journal of Alloys and Compounds* 454 (2008) 102–105.
4. I. M. Odeh, S. Mahmoud, and G. P. Vassilev, "Preparation and characterization of cobalt–bismuth nano- and micro-particles". *Int. J. Mat. Res. (formerly Z. Metallkd.)* 98 (2007) 9.
5. I.M. Odeh, S. Mahmoud, and G. P. Vassilev, "Wet-chemical synthesis and characterization of NiBi nano- and micro-particles". *Cryst. Res. Technol.*, 1 – 5 (2008).
6. Odeh, I. M., Saqqa, W. A., and Eberl, D. "Use of X-ray Diffraction and MudMaster Program in the Evaluation of Crystallite Size and Size Distributions of Illite and Kaolinite at Various Depths of Rock Formations in Jordan. ABHATH AL-YARMOUK". *Basic Sci.& Eng.* Vol. 16, No. 1, 2007, pp 1-17.

Articles published

1. John, P., **Odeh, I. M.**, Qyum, A., and Wilson, J. I. B. (1989). Photo-Oxidation of Amorphous Silicon Carbon Alloys: In *In-Situ Patterning: Selective Area Deposition and Etching*: 158: 181-187.
2. John, P., Cowie, B. C., and Odeh, I. M. (1984) .Thermal Dehydrogenation of Polysilane. *Philosophical Magazine B*, 49 (6): 559 – 564. Received: Sep. 7, 1983. Accepted: Jan.14,1984.
3. John, P., **Odeh, I. M.**, and Wood, J. (1983). The Electrical Conductivity of Polysilane (SiH₂)_x. *Journal of Chemical Society, Chemical Communications*. 24: 1496-1497, Received: Sep. 7, 1983. Accepted: Dec. 1983
4. John P., **Odeh I. M.**, Thomas M. J. K. and Wilson J. I. B., A reassessment of the vibration spectrum of hydrogenated amorphous silicon, *Solid State Communications*, 41 (1982) 341-344.
5. John P., **Odeh I. M.**, Thomas, M. J. K., and Wilson, J. I. B. Preparation and properties of polysilanes: Model Compound for Hydrogenated a-Si, *Journal de Physique*, 42 (1981) 651- 654, *Editors B. K. Chakverty and D. Kaplan.*

6. John P., **Odeh I. M.**, Thomas, M. J. K., Tricker M. J., Wilson, J. I. B. and R. S. Dariwal, Physical degradation of a-Si films on thermal treatment: a scanning electron-microscopy study, [*Journal of Material Science*,16 \(1981\) 1305- 1309.](#)
7. John P., **Odeh I. M.**, Thomas, M. J. K., Tricker M. J., Wilson, J. I. B., Infrared band assignments in oxidized hydrogenated a-Si films, [*Physica Status Solidi \(B\)* 105 \(1981\) 499- 505.](#)
8. John P., **Odeh I. M.**, Thomas, M. J. K., Tricker M. J., and Wilson, J. I. B Studies of the oscillator strengths of infrared vibration modes in glow-discharge hydrogenated amorphous silicon, [*Physica Status Solidi \(B\)* 104 \(1981\) 607- 612.](#)
9. John P., **Odeh I. M.**, Thomas, M. J. K., Tricker M. J., and Wilson, J. I. B., Silicon Hydrogen stretching modes in amorphous silicon, A semi-empirical calculation of the Infrared bandwidths, [*Phys. Status. Solidi. \(B\)* 103 \(1981\) K1 41- K1 46.](#)
10. John P., **Odeh I. M.**, Thomas, M. J. K., Tricker M. J., Wilson, J. I. B. England, J. B. and Newton, D., Determination of the hydrogen content of a-Si films by infrared spectroscopy and 24-MeV α -particle elastic scattering, [*Journal of Physics C: Solid state physics* 14 \(1981\) 309- 318.](#)
11. Tait, N. R. S., Tolfree, D. W. L., John, P., **Odeh, I. M.**, Thomas, M. J. K., Tricker, M. J. Wilson , J. I. B., England , J.B.A. and Newton, D. The hydrogen and oxygen content of self-supported carbon foils prepared by DC glow-discharge in ethylene, [*Nuclear Instruments and Methods* 176 \(1980\) 433](#)
12. John P., **Odeh I. M.**, Thomas, M. J. K., Tricker M. J., Riddoch, F., and Wilson, J. I. B. Studies of the mechanism of the decomposition of hydrogenated a-Si films, [*Philosophical Magazine B*, 42, 5, \(1980\) 671- 681.](#)
13. John P., **Odeh I. M.**, Thomas, M. J. K., Tricker M. J., McGill, J., A. Wallace, and J. I. B. Wilson, Thermal dehydrogenation of glow discharge a-Si, Proceedings of the Eighth International Conference on Amorphous and Liquid Semiconductors, Harvard University, Boston, MA. USA. Editors: W. Paul and M. Kastner. [*Journal of Non-Crystalline Solids*, 35-36 \(1979\) 237- 241.](#)
14. Wallace, A., **Odeh, I. M.**, Long A. R. and Ferrier, R. P. The Rigid Band Model in Amorphous Magnesium-Bismuth Alloys, [*Proceedings of the Seventh International Conference On Amorphous and Liquid Semiconductors, \(CICL\), University of Edinburgh, \(1977\). W. E. Spear \(Editor\).*](#)

Papers Presented at Conferences

1. **Odeh, I. M.** and Abu-Waar Z., Optical and Electrical Characterization of Amorphous Zinc Oxide (ZnO_x) Thin Films.The XX Conference on Solid State Science and Workshop on New Materials, Luxor, Egypt, (1997).
2. **Odeh, I. M.** and Shatnawi, K and K.Khasawneh, Optical properties of Amorphous Tin Oxide (SnO_x). The XX Conference on Solid State Science and Workshop on New Materials, Luxor, Egypt. (1997).
3. **Odeh, I. M.** and Shatnawi, K., Optical Properties of Thermally Evaporated Tin Oxide (SnO_x) Thin Films.Second Scientific Jordanian Week, ASTA One-day Symposium at Yarmouk University, (1994).

4. **Odeh, I. M.**, Infrared Vibration Spectra of a-Si:H First International Conference on Condensed Matter, University of Jordan, Amman. Jordan, **(1986)**.
5. **Odeh, I. M.**, John P., Thomas, M.J.K., Tricker, M.J., Wilson, J.I.B., Blistering of hydrogenated amorphous silicon, International Symposium on the Physics and Applications of Amorphous Silicon. ICTP, Trieste, Italy, **(1980)**.