

Firas Fandi Awwadi

فراس فندي محمود عوادي

Academic Curriculum Vitae

Professor of Chemistry
Dept. of Chem.
The University of Jordan.
Amman, 11942, Jordan,

6 April 2024
f.awwadi@Ju.edu.jo
Tel.(mob.) 00962798137584

Personal Information

Birth date; 24/03/1972
Marital Status; Married
Number of kids; Four
Nationality; Jordanian

Education Qualifications

- 2001-2005 Ph.D student in Physical Chemistry, Washington State University, Washington, USA. Dissertation Title; A Crystallographic and Theoretical Study of Halogen-Halogen and Halogen-Halide Synthons. Supervisor Prof. Dr. Roger D. Willett.
- 1995-1998 Master student in Physical Chemistry, Yarmouk University, Jordan. Thesis title; Fluorescence Properties of 4,4'-Diaminophenyl Sulfone and Related Compounds in α , β , and γ -Cyclodextrins Aqueous Solutions. Supervisor Prof. Dr. Khader Al-Hassan.
- 1990-1994 B. Sc. in Applied Chemistry, Jordan University of Science and Technology, Jordan.

Professional Skills

Considerable experience in single crystal X-ray determination, developing HPLC assays for determination of drugs and metabolites in biological fluids and chemical synthesis.

Familiar with many analytical techniques: crystallography (Siemens, Agilent diffractometers, Syntex P2₁ diffractometer upgraded to Bruker P4 specifications, fluorometers, UV/Vis spectrometers, HPLC, IR...etc

Familiar with many softwares; the SHELXTL program suit, Gaussian and MolPro software for quantum mechanical calculations.

Professional Experience

- February 2019-till now Full professor, The University of Jordan
- February 2019-September 2020 associate professor Kuwait University
- Feb. 2015- Feb. 2019 Associate professor, the University of Jordan
- 2011- c 2015 Assistant professor, the University of Jordan
- January 2012-June 2012 Post Doc. ; Studying the magneto-structural correlations. Clark University, Worcester, Massachusetts, USA.
- 2008-2011 Assistant professor, Tafila Technical University
- May 2010- July 2010 Visiting Professor; Studying halogen bonding interactions in hybrid organic-inorganic interactions, Bologna University, Bologna, Italy.

2006-2008	Lecturer Tafila Technical University.
2005-2006	Instructor, Jordan University of Science and Technology.
2002-2005	Teaching assistant; assisting in teaching physical chemistry labs and classes, Washington State University.
1999-2001	Assistant lecturer; teaching general chemistry class and general and organic chemistry labs, Al-Balqa` Applied University, Jordan.
1998-1999	Research Assistant; Worked on effect of oxygen on the intersystem crossing quantum yield of quinoline, Yarmouk University, Jordan.
1994-1995	Research Assistant; Worked on metabolism of drug <i>in vivo</i> and bio-availability studies, my role was to develop HPLC quantitative assays for drug determination in biological fluids (urine, plasma and serum), Jordan University of Science and Technology (Department of Pharmacology, Faculty of Medicine), Jordan.
1996-1997	Teaching Assistant; assisted in teaching general, physical, analytical and inorganic chemistry labs, Yarmouk University.

Teaching Experience:

I taught at Tafila Technical University since fall 2006 till summer 2011; in this time the offered classes cover standard undergraduate general and physical chemistry subjects. The physical chemistry (both lecture and labs) includes thermodynamics, electrochemistry, chemical kinetics, computer applications in chemistry and catalysis. During the period of my PH. D. study, I taught physical chemistry labs (both I and II).

I have been teaching at the University of Jordan since fall 2011; the offered classes cover quantum chemistry for undergraduates and master students, chemical kinetics, electrochemistry, physical chemistry labs I and II, and general chemistry.

Administrative Experience

September 2023 - up until now Head of the Department Chemistry, The University of Jordan
 February 2017 -September 2018 Head of the Department Chemistry, The University of Jordan
 9/2016- 9/2017 A member of the Central Tender Committee, The University of Jordan

Masters Supervision

- 1- Manal I. Alwahsh (2013-2015); Conformational Polymorphism in Bis(2-Iodo-5-substituted pyridine) dihalocopper(II): Theoretical, Crystallographic and Spectroscopic Studies.
- 2- Diala A. Qdimat (2013-2015); The Role of C-Y...X Halogen Bond Interactions in Controlling the Crystal Structure of Halopyridinium Iodine Dichloride Salts; Crystallographic and Theoretical Studies
- 3- Faten Kamal Abu-Zaineh (2022-2023); Nitrate and Perchlorate Ions as Halogen Bond Acceptors in Halopyridinium Salts; Theoretical and Crystallographic Studies

Manuscript Reviewer for:

- 1-Crystal Growth and Design

- 2-Inorganic Chemistry
- 3-RSC advances
- 3-Physical Chemistry Chemical Physics
- 5-Dalton Transaction.
- 6-CrystEngComm
- 7-Journal of Molecular Structure
- 8-Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy
- 9-Polyhedron
- 10-Journal of Coordination Chemistry
- 11. Inorganica Chimica Acta
- 12-New Journal of Chemistry
- 13-Jordan Journal of Chemistry
- 14-Kuwait Journal of Science
- 15-Dirrasat (Jordan University)
- 16- ACS omega

Conferences:

1. **Invited speaker, Firas F. Awwadi**, The Competition between Halogen and Hydrogen bond Interactions in Halopyridinium Tetrahalocuprate(II) Salts. *1st International Symposium on Halogen Bonding*, 18-22 June, 2014, Porto Cesareo, Italy.
2. **Firas F. Awwadi**; Salim F. Haddad; Brendan Twamley and Roger Willett, Effect of Intermolecular Interactions on the Molecular Structure; Theoretical study and Crystal Structures of 4-Bromopyridinium Tetrafluoroborate and diaqua(3-bromopyridine)difluorocopper(II). *Eurasia Conference on Chemical Sciences-11*, 6-10 October 2010, The Dead Sea, Jordan
3. **Firas F. Awwadi**; Willett, Roger D.; Peterson, Kirk; Twamley, Brendan, Crystallographic and Theoretical Studies on the Role of Halogen-halide Synthons in the Crystal Structures of (nYP)X, (nYP)₂CuX₄ and Cu(nyp)₂X₂, *American Crystallographic Association, 2004 Annual Meeting*, July 17 – 22. Chicago, Illinois, USA.
4. **Firas F. Awwadi**; Willett, Roger D.; Haddad, Salim; Twamley, Brendan, The Role of the Aryl C-Br...X⁻ Synthon in the Crystal Structure of Copper(II) Halide Salts, *American Crystallographic Association, 2003 Annual Meeting*, July 26 – 31. Cincinnati, Ohio, USA.
5. Willett, Roger D.; **Firas F. Awwadi**; Zhenming, Wang; Twamley, Brendan, Structure and Magnetic Properties of MX₄²⁻ Salts of Cu(TIM)²⁺, *American Chemical Society Northwest Regional Meeting*. Spokane, WA, USA. June 2002.
6. Firas Awwadi 2-bromopyridine as molecular bender. The Seventh Jordanian International conference, 19-21 April, 2016, Irbid, Jordan

Master Examining

- 1- Alaa Omar Zayed, Theoretical Study of the Structure of 2,6-Dibromopyridinium Halide Salts, December 2010. Dept. of Chem., the University of Jordan.

- 2- Abdu Al-raziq Za.arour, a Spectroscopic and Thermodynamic Studies of Complexation of Acyclic Thiocrown Ethers with [60]Fullerenes, 2012. Dept. of Chem, Mutah University.
- 3- Aisha Nawaf Alblawi, Synthesis and Characterization of Poly(1,4-Benzenedimethylene Phthalate) and the Study of its Ability to Adsorb Pb(II), Cd(II), and Zn(II) ions, November 2012. Dept. of Chem., the University of Jordan.
- 4- Ayman S. Almomani, Correlation between Sensory and Chemical Properties with Fluorescence Characteristics of Olive oil in Jordan, December 2012. Dept. of Chem., Yarmouk University.
- 5- Yousef Alomari , The Use of Fluorescence Spectroscopy as a Tool to Classify and to Follow Quality and Purity of Jordanian Honey, July 2013. Dept. of Chem., Yarmouk University.
- 6- Amer W. Al-Wardat, Quantification of Polyphenols, α -Tocopherols and Some other Components in Olive and leaves by Means of Optical Absorption and Fluorescence Spectroscopy. A way to Distinguish between Olive Oil Produced in Jordan from Irrigated and non-Irrigated Areas, December, 2013. Dept. of Chem., Yarmouk University.
- 7- Abdallah Hasan Abdallah Alfayyumi, Ruthenium(II) complexes of α -diimines: synthesis, DFT calculation , spectral characterization, electrochemical properties and single-crystal X-ray structure of 1-(quinolineimino)-1-(phenylhydrazono)-propan-2-one. Summer August, 2015. Hashimite University
- 8- Mohammed Ahmed Al-wahis, Preperation and Characterization of Some Ruthenium Complexes with the Mixed Donor Ligands: N-P and N-S.
- 9- Enas Mahmoud A. Abd –Alhai, Synthesis and Characterization of some Chromium(III) Salen Complexes. August 2005. The University of Jordan.
- 10- Nader Hussni Abd-alqader, Planar versus Twisted Intramolecular Charge Transfer Fluorescence of n,n-diphenylaminobenzonitrile and Related Compounds in Different Media, Yarmouk University, May 2015.
- 11- Abdallah Alzoubi, The Use of Fluorescence Spectroscopy to Study the Role of Cyclodextrin Cavity Size on the Dispersion of Aggregates (Nato Structures) of P-(N-carbazole)benzonitrile , p-(N-carbazole)methylbenzoate and Other Related Compounds in Aqueous Solution. Yarmouk University, December 2016.
- 12- Lina Kamal Khader, Synthesis of Some N,N'- bis(4-notrophenyl)Oxamide Metal complexes, Spectral and Thermal Investugations of their Structures and Studies of Their Biological Activities. The University of Jordan, Mayt, 2017.

- 13- Monther S. Zreid,SYNTHESIS, CHARACTERIZATION AND UV-Vis SPECTRAL PROPERTIES OF NOVEL RUTHENIUM COMPLEXES UTILIZING 3-/ 5-(2-PYRIDYL)-1,2,4-TRIAZIN-6-ONES, The University of Jordan, August, 2016.

Ph. D. external Examiner

1. The thesis “Magnetostructural Correlations in Tetrahalocuprates” submitted by Chris Saunders for the degree Doctor of Philosophy at Canterbury University, Christchurch, New Zealand.

Awards:

- 1- الباحث الاكثر نشرًا في قاعدة بيانات Scopus في العام 2017/2018- الجامعة الاردنية
- 2- جائزة الباحث المتميز عن الكليات العلمية للعامين 2013/2014- الجامعة الاردنية
- 3- جائزة نقابة المهندسين الزراعيين عن أفضل بحث علمي تطبيقي " النشاط السام الانتقائي لمركبين تم عزلهما من احد انواع الطيون البري" والمنشور في المجلة العالمية المحكمة "Natural Product Research" ، وهو من اعداد كل من الدكتور بركات ابو رملية من قسم وقاية النبات في كلية الزراعة، والدكتورة امل العابودي، والدكتور موسى ابو زرقه، والدكتور سليم حداد، والدكتور فراس عوادي من قسم الكيمياء في كلية العلوم.
- 4- Fulbright Fellowship, Clark University, Worcester, Massachusetts, USA, January-June, 2012.
- 5- Erasmus Mundus academic staff scholarship, University of Bologna, Bologna, Italy, May-July, 2010.
- 6- Harold Dodgen Outstanding Graduate Seminar Award. Physical Chemistry and Material Science Program, Department of Chemistry, Washington State University Pullman, Washington, USA. April 2004.
- 7- Donald S. Matteson Graduate Fellowship Fund in the Department of Chemistry, Washington State University, Pullman, Washington, USA.
- 8- Margret C. Etter Student Lecturer Award, American Crystallographic Association, 2003 Annual Meeting July 26-31. Cincinnati, Ohio, USA.
- 9- Harold Dodgen Outstanding Graduate Seminar Award. Physical Chemistry and Material Science Program, Department of Chemistry, Washington State University Pullman, Washington, USA. May 2003.
- 10- Travel Grant Award, American Crystallographic Association, 2003 Annual Meeting July 26 – 31. Cincinnati, Ohio, USA.
- 11- Harold Dodgen Outstanding Graduate Seminar Award. Physical Chemistry and Material Science Program, Department of Chemistry, Washington State University Pullman, Washington, USA. April, 2002.
- 12- Listed on the honor list, Department of Chemical Sciences, Faculty of Science, Jordan University of Science and Technology, Irbid Jordan. Spring 1993.
- 13- Listed on the honor list, Department of Chemical Sciences, Faculty of Science, Jordan University of Science and Technology, Irbid Jordan. Fall 1993.

References:

Dr. Brendan Twamley.
University Research Office
114 Morrill Hall
P. O. Box 443010
University of Idaho,
Moscow, ID, 83844-3010.

Tel (01) 208 885 2847
Email; btwamley@uidaho.edu
www.uro.uidaho.edu/xray

Professor Dr. Kirk Peterson
Department of Chemistry,

Washington State University.
Pullman, Wa, 99164. USA.
Tel; (01) 509-335 7867
Email; kipeters@wsu.edu
<http://tyr0.chem.wsu.edu/%7Ekipeters/>

Professor Dr. Mark M. Turnbull
Carlson school of chemistry and biochemistry
Clark University

Office: S307, Sackler Sciences Center
Phone: 508-793-7167

Patents:

Nabil A. Al-zeqri, Ismail K. Warad, Firas F. Awwadi, Ali M. Alsalmeh, Anas K. Alali, Abdelkader Zarrouk, Method of synthesizing (E)-1, 2-di (pyridin-2-yl) ethene-1, 2-diol, 2018, US Patent, 15860578.

Publications:

- 1- Mousa Al-Noaimi, Firas F Awwadi, Dhuha Al-Wahib, Sanaa Bardaweel, Akef Alhmaideen, Manal Al-Shamari; Competition Between Cu-Br Semi-coordinate bond and CH \cdots Br, CH \cdots S and S \cdots S Interactions; New Two Thioalkylazothiophenol (SNS) Copper (II) Dimers [Cu (L)(μ -Br)]₂, Available online 5 January 2024, 116827
- 2- Shazia Waseem, Ayesha Javaid, Muhammad Imran, Muhammad Naveed Qasim, Tahir Ali Sheikh, Muhammad Nadeem Shahzad, Murad A AlDamen, Firas F Awwadi, Muhammad Nadeem Akhtar, Inorganic Chemistry Communications Volume 162, April 2024, 112176
- 3- Mathew R Graci, Firas F Awwadi, Diane A Dickie, Christopher P Landee, Mark M Turnbull: Synthesis, coordination modes, structures, and magnetic properties of halogen-substituted 2-hydroxypyridine copper (II) chloride coordination compounds, Published online: 03 Jan 2024.
- 4- Lixin Li, Alexander Shapiro, Firas F Awwadi, Christopher P Landee, Mark M Turnbull, Jan L Wikaira; Tetrahalidocuprate (II) complexes with substituted pyridinium ions: effects of halide substitution, Published online: 30 Dec 2023
- 5- Firas F. Awwadi, Mai K.M. Aldokh, Manal I. Alwahsh, Hamdallah A. Hodali, Chirality and thermal stability of four salen complexes: Crystallographic, theoretical and TGA studies 244, 1 November 2023, 116623
- 6- [Abdussalam K. Qaroush](#), [Ala'a F. Eftaiha](#), [Feda'a M. Al-Qaisi](#), [Khaleel I. Assaf](#), [Suhad B. Hammad](#), [Malak H. Al-Anati](#), [Enas S. Radwan](#) and [Firas F. Awwadi](#), Newly synthesized imidazolium precursors for CO₂ utilization and sequestration: aprotic *versus* protic salts Catalysis Science & Technology 2023,13, 3245-3257
- 7- Antiproliferative, Anti-Inflammatory and Anti-Microbial Activities of Synthesized Benzo[f]benzo[4,5]imidazo[1,2-d][1,4]oxazepine and Benzo[f]benzo[4,5] oxazolo[3,2-

E-mail: mturnbull@clarku.edu

Professor Dr. Christopher Landee.

Adjunct Professor of Chemistry
Department of Physics
Clark University
Worcester, MA 01610-1477

Office: 243 BioPhysics; Lab: S-133

Phone: 508-793-7439; Lab phone: 508-793-7465

Email: clandee@clarku.edu

d][1,4]oxazepine Derivatives Khalid M. Abu Khadra, a Huda A. AL-Saadi, Areej M. Assaf, Firas F. Awwadi and Shehadeh Mizyed, *J. Braz. Chem. Soc.*, Vol. 00, No. 00, e-20230116, 2023

- 8- F. Awwadi, M.I. Alwahsh, M.M. Turnbull, C.P. Landee, Halogen Bond and Polymorphism in trans-Bis (2-Iodo-5-Halopyridine) dihalocopper (II) Complexes: Crystallographic, Theoretical and Magnetic Studies, *CrystEngComm* 25 (16), 2390-2403
- 9- M.J. Bichan, Y.K. Al-Bayati, F.M. AL-Abady, F.F. Awwadi, Theoretical study of molecularly imprinted polymers prepared for homatropine methylbromide, *Journal of Polymer Research* 30(4) (2023) 142.
- 10- M.J. Bichan, F.M. AL-Abady, Y.K. Al-Bayati, F.F. Awwadi, Preparation and computational investigation of molecular imprinted polymers for Clidinium Bromide, *Journal of the Indian Chemical Society* 100(1) (2023) 100850.
- 11- C.P. Landee, F.F. Awwadi, B. Twamley, M.M. Turnbull, Coordination chemistry and magnetic properties of copper (II) halide complexes of quinoline, *Journal of Coordination Chemistry* 75(19-24) (2022) 2616-2627.
- 12- F. Mouffouk, M. Emira, M.H. BinSabt, A. Husain, A. Alhendal, M. Zourob, A. Meslam, F. Awwadic, Piezoelectric Nanogenerator Driven by Light-Powered Molecular Motors, *ACS Applied Electronic Materials* 4(7) (2022) 3470-3477.
- 13- M.I. Alwahsh, F.F. Awwadi, M.H. Kailani, Polymorphism and isomorphism in trans-bis (2, 5-diiodopyridine) dihalocopper (ii) complexes: theoretical and crystallographic studies, *New Journal of Chemistry* 46(39) (2022) 19024-19035.
- 14- M. Al-Noaimi, F.F. Awwadi, A. Hendal, A. Aljammal, W.H. Talib, A.I. Mahmud, Effect of chalcogen bonding interactions on molecular structures; theoretical and crystallographic studies on two palladium (II) acetate complexes, *New Journal of Chemistry* 46(38) (2022) 18551-18562.
- 15- M.M. Abadleh, A.H. Abdullah, J.A. Zahra, S.S. Sabri, F.F. Awwadi, M.M. El-Abadelah, Thiophene Ring-Opening Reactions IV. Facile Generation of Novel Ethyl 4-hydroxy-6-thioxonicotinate-1, 3, 4-thiadiazoline Hybrids, *Letters in Organic Chemistry* 19(6) (2022) 504-510.
- 16- A.H. Abdullah, J.A. Zahra, S.S. Sabri, F.F. Awwadi, M.M. Abadleh, Q.M. Abdallah, M.M. El-Abadelah, Thiophene Ring-opening Reactions III: One-Pot Synthesis and Antitumor Activity of 1, 3, 4-Thiadiazoline–Benzothiazolo [3, 2-b] pyridazine Hybrids, *Current Organic Synthesis* 19(2) (2022) 279-290.
- 17- A.H. Abdullah, J.A. Zahra, S.S. Sabri, F.F. Awwadi, A.Q. Hussein, M.M. El-Abadelah, Thiophene ring-opening reactions VI. Attempted cyclization towards [fused]-tricyclic system involving a thiolate anion and suitably located electrophilic carbon, *Zeitschrift für Naturforschung C* 78(3-4) (2023) 133-140.
- 18- A. Al-Azmi, F.F. Awwadi, Theoretical and X-ray studies on the cyclisation of 1-phenyl-5-(3-aryltriaz-1-en-1-yl)-1H-pyrazole-4-carbonitriles and 2-amino-3-(3-aryltriaz-1-en-1-yl) maleonitriles: A comparison study, *Kuwait Journal of Science* 49(3) (2022).
- 19- A.M. Jaber, J.A. Zahra, S.S. Sabri, M.A. Khanfar, F.F. Awwadi, M.M. El-Abadelah, New Trends in 1, 4-Dipolar Cycloaddition Reactions. Thermodynamic Control Synthesis of Model 2'-(isoquinolin-1-yl)-spiro [oxindole-3, 3'-pyrrolines], *Current Organic Chemistry* 26(5) (2022) 542-549.
- 20- F.F. Awwadi, H.A. Hodali, H.A. Hodali, Synthesis, Spectroscopic Properties and Single Crystal X-ray Structure of Dithiocyanato-N-bis [8-(diphenylphosphino)-quinoline] ruthenium (II), *Jordan Journal of Chemistry (JJC)* 17(2) (2022) 85-89.

- 21- Awwadi, Firas F., Lina A. Dahabiyeh, and Imad I. Hamdan. "Trimolecular Co-Crystals of Ciprofloxacin, P-Coumaric Acid, and Benzoic Acid or Salicylic Acid." *Journal of Chemical Crystallography* (2022/01/27 2022).
- 22- Al-Noaimi, Mousa, Sonia Benabid, Hanane Hamani, Qusay F. A. Salman, Mohammad Binsabt, Firas F. Awwadi, Khaoula Douadi, and Tahar Douadi. "Corrosion Inhibition of Carboxylate Substituted Amidrazone on Mild Steel in 3% Nacl Medium: Electrochemical, Dft and Molecular Dynamics Simulation Studies." *Chemical Data Collections* 40 (2022/08/01/ 2022): 100877.
- 23- Al-Noaimi, Mousa, Firas F. Awwadi, Iman A. Mansi, Mohammad Sawwan, Bashaer Abu-Irmaileh, and Necmi Dege. "Polymorphism, Spectroscopic, Dft and Anticancer Activity of a Palladium(Ii) Complex with a Thiophenyl Azoimine-Quinoline Snn'n" Ligand." *Polyhedron* 211 (2022/01/01/ 2022): 115541.
- 24- Kailani, Mohammed H., and Firas F. Awwadi. "4-(9h-Fluoren-9-Yl)-4-Methylmorpholin-4-Ium Bromide, C18h20brno." *Zeitschrift für Kristallographie - New Crystal Structures* 236, no. 1 (2021): 179-80.
- 25- Fuqha, Muheeb, Firas F. Awwadi, Salim F. Haddad, Nabil Al-Zaqri, Fahad A. Alharthi, Mohammed Suleiman, Abdelkader Zarrouk, Ahmed M. Boshala, and Ismail Warad. "Design, Xrd/Hsa-Interactions, Spectral, Thermal, Solvatochromism and DNA-Binding of Two [Cu(Phen)(Triene)]Br₂ Complexes: Experimental and Dft/Td-Dft Investigations." *Journal of Molecular Structure* 1231 (2021/05/05/ 2021): 129983.
- 26- Daqqa, Malak, Abeer A. AlObaid, Nabil Al-Zaqri, Firas F. Awwadi, Abdelkader Zarrouk, Ali Alsalmeh, Raghad Alasmari, Abdunasser Karami, and Ismail Warad. "Ultrasonic Synthesis, Xrd/Hsa-Interactions, Dft, Time-Dependence Spectrophotometric Stability and Thermal Analysis of the Water-Bridge {[Cu(Phen)₂Br]Br·H₂O} Complex." *Journal of King Saud University - Science* 33, no. 5 (2021/07/01/ 2021): 101464.
- 27- Awwadi, Firas F., Manal I. Alwahsh, Mark M. Turnbull, Christopher P. Landee, and Brendan Twamley. "Two New Canted Antiferromagnetic Systems: Magnetic, Theoretical, and Crystallographic Studies on Trans-Bis(2-Iodopyridine)Dihalocopper(Ii)." *Dalton Transactions* 50, no. 12 (2021): 4167-78.
- 28- Ashram, Muhammad, Ahmed Al-Mustafa, Wael A. Al-Zereini, Firas F. Awwadi, and Islam Ashram. "A Convenient One-Pot Approach to the Synthesis of Novel Pyrazino[1,2-a]Indoles Fused to Heterocyclic Systems and Evaluation of Their Biological Activity as Acetylcholinesterase Inhibitors." *Zeitschrift für Naturforschung B* 76, no. 5 (2021): 303-12.
- 29- Al-Wahish, M. A., F. F. Awwadi, and H. A. Hodali. "Erratum To: Synthesis, Characterization, Computational Studies and Single Crystal Structures of [Ru(N-P)₂(O-O)] Complexes." *Journal of Structural Chemistry* 62, no. 9 (2021/09/01 2021): 1483-84.
- 30- Al-Wahish, M. A., F. F. Awwadi, and H. A. Hodali. "Synthesis, Characterization, Computational Studies and Single Crystal Structures of [Ru(N-P)₂(O-O)] Complexes." *Journal of Structural Chemistry* 62, no. 7 (2021/07/01 2021): 1056-65.
- 31- Al-Noaimi, Mousa, Esam Qnais, Firas F. Awwadi, and Manal I. Alwahsh. "Synthesis, X-Ray Structure, Spectroscopic Electrochemistry, Anti-Nociceptive Activity and Dft Study of Cis-[Ru(Eph₃)(L)Cl₂] Complexes (E = p, as and Sb) (L = thioether-Azoimine Tridentate Snn Donor Ligands)." *Polyhedron* 202 (2021/07/01/ 2021): 115195.
- 32- Al-Noaimi, Mousa, Firas F. Awwadi, Nayyef Aljaar, Ayman Hammoudeh, Raja Bader, and Rawaa Al-Azzawi. "Ruthenium(Ii) Complexes Bearing Thioether-Azoimine Tridentate Snn Donor Ligands:

- Synthesis, Spectroscopic Properties, Structural Characterization, Electrochemistry, and Catalytic Activity." *Journal of Molecular Structure* 1229 (2021/04/05/ 2021): 129808.
- 33- Abdullah, Ahmad H., Mustafa M. El-Abadelah, Jalal A. Zahra, Salim S. Sabri, and Firas F. Awwadi. "Thiophene Ring-Opening Reactions Ii. Easy Synthesis of 1,3,4-Thiadiazoline-Sulfanylpyridazine Hybrids." *Monatshefte für Chemie - Chemical Monthly* 152, no. 7 (2021/07/01 2021): 853-62.
- 34- Abadleh, Mohammed M., Ahmad H. Abdullah, Firas F. Awwadi, and Mustafa M. El-Abadelah. "Thiophene Ring-Opening Reactions. Direct Access to the Synthesis of 1,3,4-Thiadiazoline-(Condensed) Pyridone Hybrids." *Tetrahedron* 83 (2021/03/12/ 2021): 131957.
- 35- Rawajfeh, R. S., F. F. Awwadi, S. K. Bardaweel, and H. A. Hodali. "Synthesis, X-Ray Structures, and Anticancer Activity of Co(Ii), Cu(Ii), Ni(Ii), and Pd(Ii) Complexes with a Salen Ligand Derived from Trans-1,2-Diaminocyclohexane." *Journal of Structural Chemistry* 61, no. 12 (2020/12/01 2020): 1985-92.
- 36- Ghazzy, Asma, Deeb Taher, Wissam Helal, Marcus Korb, Khaled Khalyfeh, Firas F. Awwadi, Rasha K. Al-Shewiki, *et al.* "Aryl Ferrocenylmethylesters: Synthesis, Solid-State Structure and Electrochemical Investigations." *Arabian Journal of Chemistry* 13, no. 1 (2020/01/01/ 2020): 3546-57.
- 37- El-Abadelah, Mustafa M., Firas F. Awwadi, Ahmad H. Abdullah, and Wolfgang Voelter. "The Reaction of Imidazo[1,5-a]Pyridines with Ninhydrin Revisited." *Zeitschrift für Naturforschung B* 75, no. 6-7 (2020): 559-65.
- 38- Awwadi, Firas F., Deeb Taher, Mohammed H. Kailani, Manal I. Alwahsh, Fadwa Odeh, Tobias Rüffer, Dieter Schaarschmidt, and Heinrich Lang. "Halogen Bonding Interactions in Halopyridine–Iodine Monochloride Complexes." *Crystal Growth & Design* 20, no. 2 (2020/02/05 2020): 543-51.
- 39- Al-Zaqri, Nabil, Kifah S. M. Salih, Firas F. Awwadi, Ali Alsalmeh, Fahad A. Alharthi, Amjad Alsyahi, Anas Al Ali, *et al.* "Synthesis, Physicochemical, Thermal, and Xrd/Hsa Interactions of Mixed [Cu(Bipy)(Dipn)](X)₂ Complexes: DNA Binding and Molecular Docking Evaluation." *Journal of Coordination Chemistry* 73, no. 23 (2020/12/01 2020): 3236-48.
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Workshops:

- 1- Electronic structure of Molecules, Petra, Jordan, January, 2006.

Instructors

Dr. Roald Hoffmann, Cornell University, Ithaca, New York, *Nobel Prize Laureate*.

Dr. Pere Alemany, University of Barcelona, Spain.

- 2- Solving Twinned Structures Cincinnati, Ohio, USA, July, 2003.
- 3- NANO-TECH Summer School that took place from 25th September until 1st October in Chemnitz, Germany and from 8th October until 13th October 2016 in Amman, Jordan.