

**Experienced Synthetic Chemist (organic and inorganic) Clean Chemical Technology**

**Education**

1. **University of York 2002-2006:** PhD in Green Chemical Technology (multidisciplinary project)  
**Thesis title:** Ligand Design for Metal Catalysed Reactions in Supercritical Carbon Dioxide
2. **Azzahra University 1995-1997:** MSc. in organic chemistry (1<sup>st</sup> Class Hons), Iran.  
**Thesis title:** Synthesis of new derivatives of 6H[1,2,4] Triazino [1,3,4] Thiadiazine
3. **Tehran University 1983-1988:** BSc in pure chemistry, Tehran, Iran.

**Work experiences**

1. Chemistry Assistant Professor (**IROST, 2006-Present**).
2. Manager of Organic Chemistry & Polymer Division (**IROST, 2007-2011**).
3. NMR demonstration of physical inorganic (2nd year undergraduates and Mchem advanced project), Practical demonstration for Mchem advanced project (3<sup>rd</sup> year undergrads) and undergraduate final year research project co-supervision (**University of York, 2002-2004**).
4. Academic member and supervisor in department of organic chemistry and polymers (**IROST, 1991-2002**).
5. Researcher and supervisor in department of chemistry (**Gahad-e-Daneshgahi, Tehran University, 1988-91**).

**Key skills**

***Research***

1. Fuel cell technology, Hydrogen storage systems, Gas, Liquid and Solid systems (**IROST, 2010-present**)
2. Optimizing conditions for extraction of active components from Hypericum Perforatum using response surface methodology (**IROST, 2010-2011**)
3. Counter current extraction of active components from Hypericum Perforatum using response surface methodology (**IROST, 2010-2011**)
4. Feasibility study of preparation of food grade emulsifier for bulky bread (**IROST, 2011**)
5. Bench scale preparation of biodiesel from available feedstock using ultrasound (**IROST, 2009-2010**)
6. Preparation, characterisation and application of nanomaterials as reinforced reagents in polymers (**IROST, 2007-2009**)
7. Designing of CO<sub>2</sub>-philic phosphinites, phosphines, bis(iminopyridyl) and bis(diphenylphosphine) macromolecular ligands and their characterisations (**PhD, 2002-2005**).
8. Synthesis of Pd, Pt and Rh of PDMS based complexes and their characterisations (**PhD**).
9. Performing the C-C coupling reactions including the Heck, Suzuki and Still reactions in toluene and scCO<sub>2</sub> (**PhD**).
10. Synthesis of supported catalyst and its characterisation using DRIFT, TGA, TEM and NMR (**PhD**).
11. In-Situ Preparation of Catalytic Palladium Nanoparticle – Silica Composites in scCO<sub>2</sub> (**PhD**).
12. Process for the production of tocopherol concentrates from the deodorised Sludge of vegetable oils in Iranian Industry, principal researcher, (**1999-2002, IROST project**).
13. Manufacture of Tartaric acid, cream of tartar and Rochelle salt from grape wastes (pomace and argol) at grape juice Iranian Industries, principal researcher, (**1998-2000 IROST project**).
14. Manufacture of Acetanilide and p-Nitro aniline, (**1994-1995, IROST**).
15. Manufacture of Mafnideacetate, (**1993-1994, IROST**).
16. Preparation of concentrate of protein from tomato pastes, (**92-94, IROST**)
17. Preparation of Chloroquin diphosphate, (**1991-1992, IROST**)
18. Photographic chemical processing focusing on black-white and colour photography, principal researcher (**1989-1990, Tehran university**).
19. Isolation, purification and identification of fluorescence material in typewriter ribbon and its formulation for use in an automatic post office, principal researcher (**1988-1989, Tehran University**)

## ***Organometallic and Organic Synthesis***

1. Fully trained in air-sensitive synthetic chemistry including Schlenk line techniques, high vacuum lines and M-Braun glove box (used on a daily basis throughout the PhD). Using the Radleys carousel reactor for high-throughput synthesis for both high temperatures and very low temperatures (-78 °C) reactions under N<sub>2</sub>. Synthesis of thermal, water and oxygen sensitive organic and inorganic ligands and their complexes.
2. Purification of organic and inorganic compounds by distillation (including vacuum transfer), chromatography (including flash, column and preparative TLC), Purification of organic reagents and solvents including Grubbs' type solvent purification columns.
3. Synthesis of polymer-organometallic blends and the preparation of nanoparticles of macromolecular polymerc ligands coordinated to early transition metals.
4. Conducting the reactions in scCO<sub>2</sub> using the high-pressure (up to 250 bar) supercritical line and its maintenance (hands-on).

## ***Analytical techniques***

1. Extensive experience with Jeol EX270, Bruker AMX300 and Bruker AV500 NMR spectrometers (throughout the PhD "hands on"), conducting <sup>1</sup>H, <sup>13</sup>C{<sup>1</sup>H}, <sup>31</sup>P{<sup>1</sup>H} and <sup>29</sup>Si{<sup>1</sup>H} experiments).
2. Experiences with the atomic absorption and UV-Visible spectrometer.
3. Using the DRIFT, FT-IR and IR spectrometers including the interpretation of the results gained.
4. Analysis of GPC data and preliminary knowledge of using GPC.
5. Analysis of TEM microphotographs, e.g. size of particles and their distributions.
6. Analysis of TG and DSC thermographs of silica supported hybrid catalysts.
7. Analysis of MALDI-TOF spectra as a tool to determination of exact molecular weight of polymers.

## ***Courses***

1. Several post-graduate courses including taught courses and current awareness courses during the PhD to enhance knowledge and promote awareness of traditional to cutting edge chemistry e.g. advanced NMR spectroscopy and its interpretation, activation of small molecules & catalysis, asymmetric synthesis and green chemistry metrics.
2. Several postgraduate transferable skill courses during PhD studies to develop personal skills (time management, communication, team working and *etc.*)

## ***Computational skills***

1. Fully trained in using Chem Office 2004 and NMR packages.
2. Extensive experience in scientific databases searching e.g. WOK, Beilstein
3. Extensive experiences in using EndNote package to record bibliographical references.

## ***Conference Oral and Poster Presentations***

1. The first national conference on Hydrogen and Fuel Cell, Iran university of Science & Technology, January 2009
  - 1.1. Hydrogen generation by the catalytic reforming processes in fuel cell application.
  - 1.2. Recent advances in Physisorption of Hydrogen for fuel cell application.
2. Main Group Chemistry, a RSC, Dalton Division Meeting, University College London, June 2006
3. Symposium on 'Supercritical Fluids and the Future', University of Birmingham March 2004
4. Symposium on "Green Solvents for Synthesis", Bruchsal, Germany, 2004
5. Dalton Discussion conference on "Inorganic chemistry and catalysis (RSC)", University of York, September 2003
6. M.M. Heravi and S. Safarzadeh, Synthetic studies in the 6H-[1,2,4]Triazino[3,4-b] thiadiazin new derivatives, 5th Iranian Seminar of Organic Chemistry, Isfahan University of Technology, 1996, 58
7. M.M. Heravi and S. Safarzadeh, Synthesis of 5,9-Disubstituted 1,2,4-Triazino [2,3-b]1,3, 4-Thiadiazine , 6th Iranian Seminar of Organic Chemistry, University of Tabriz, 1997, 70

## **Research publications**

1. S. Saffarzadeh-Matin, *Ligand Design for Chemical Synthesis in Supercritical Carbon Dioxide, Basics, Concepts, Methods*, 2010, Lambert Academic Publishing, Germany
2. A. Shalmashi, S. Saffarzadeh, *Biodiesel, a realistic fuel alternative for diesel engines*, 2010, book in press
3. S. Saffarzadeh Matin, M Rangbar, *Preparation of Colloidal and Nanosilica from Glass Water*, Iranian Patent, 49833, 28 Jun. 2008
4. M Rangbar, S. Saffarzadeh Matin, *Preparation of Alkali Silicates using Silica fumes (pyrometallurgical dusts)*, Iranian Patent, 50002, 5 Jul. 2008
5. T. Omid, S. Saffarzadeh Matin, *Design and Manufacturing of Molecular Distillation system equipped with the Temperature and Pressure Monitoring Devices for the Separation of Tocopherols from Iranian Vegetable Oils Purifying Factories*, Iranian Patent, 41990, 13 Aug. 2007
6. S. Saffarzadeh-Matin, C. M. Chuck, F. M. Kerton and C. M. Rayner, *Polydimethylsiloxane-Derived Phosphine and Phosphinite Ligands: Synthesis, Characterization, Solubility In Supercritical Carbon Dioxide And Sequestration On Silica*, *Organometallics*. 2004, **23**, 5176
7. S. Saffarzadeh-Matin, F. M. Kerton, J. L. Lynam and C. M. Rayner, *Formation and catalytic activity of Pd nanoparticles on silica in supercritical CO<sub>2</sub>*, *Green Chemistry*, 2006, 8, 965-971
8. S. Saffarzadeh-Matin, F. M. Kerton, J. L. Lynam and C. M. Rayner, *Synthesis and characterisation of amino- and acetylacetonato-modified cyclosiloxanes*, Manuscript in Preparation.
9. S. Saffarzadeh-Matin, F. M. Kerton and C. M. Rayner, *Preparation of Carbon Dioxide Soluble Polydimethylsiloxane-Derived Ligands using Amine Functionalised Polydimethylsiloxane Reagents*, *J. Supercrit. Fluids*, Manuscript in Preparation.
10. F. M. Kerton, S. Saffarzadeh-Matin, *Organic synthesis in supercritical carbon dioxide*, Mini-reviews in *Organic chemistry*, Manuscript In Preparation
11. M.M. Heravi and S. Safarzadeh, *Synthesis of 5,9-Disubstituted 1,2,4-Triazino [2,3-b]1,3, 4-Thiadiazine*, 6th Iranian Seminar of Organic Chemistry, University of Tabriz, 1997, 70
12. M.M. Heravi and S. Safarzadeh, *Synthetic studies in the 6H-[1,2,4]Triazino[3,4-b] thiadiazin new derivatives*, 5th Iranian Seminar of Organic Chemistry, Isfahan University of Technology, 1996, 58
13. S. Safarzadeh, *Chemistry of colour photography*, *Iranian journal of chemistry*, 1992, **10**, 1123.
14. S. Saffarzadeh, *polymers in photography*, *Iranian journal of science and technology of polymer*, 1991, **20**, 143

## **Awards**

1. White Rose studentship awarded for a PhD in green chemistry, **University of York, 2002**
2. First award as a Valued Member of Academic Board and Supervisor, **IROST, 2000.**
3. First award for scientific expertise in the Iranian Research Organisation for Science and Technology (**IROST**), **1998.**
4. First prize at the Fifth Specialised Organic Chemistry Congress in Iran, **1997**
5. First prize in scientific competition (chemistry), **Tehran University, 1982.**