Curriculum Vitae

1. Personal details and the date of the CV

- Name and Surname: Dr. Ali Khoshsima (PhD)
- Researcher IDs:

ORCID ID: https://orcid.org/0000-0002-3210-7203

Google Scholar: https://scholar.google.ca/citations?user=MP3PWiwAAAAJ&hl=en

- Email: ali.khoshsima@gmail.com, a.khoshsima@hsu.ac.ir
- Date of birth: June 16, 1984
- Date of the CV: May 08, 2021

2. Degrees

- PhD: Chemical Engineering

Iran University of Science and Technology (IUST), Tehran, Iran

Thesis: "Experimental and modelling study on phase behavior and surface chemistry of mixtures containing surfactants, hydrocarbon and brine" supervising by Dr. Mohammadreza Dehghani

Note: My PhD thesis was performed in close collaboration with the solution chemistry group of Prof. Werner Kunz (Universität Regensburg, Germany)

- Master of Science: Chemical Engineering-gas processing and transmission (GPA: 17.63/20)

Petroleum University of Technology, Ahwaz, Iran

Thesis: "Thermodynamic Modeling of water content of sour natural gas" supervised by Dr. Reza Behbahani and Prof. Mahmood Moshfeghian (Oklahoma, USA)

(*Petroleum University of Technology is the best petroleum and gas engineering university in Iran that only concentrated to petroleum and gas engineering processes and is funded directly by National Iranian Oil Company (NIOC)*)

- Bachelor of Science: Chemical Engineering (GPA: 16.16/20)

Sharif University of Technology, Tehran, Iran

(*Sharif University of Technology is the best engineering and technical university in Iran*)

- Diploma: Mathematics (GPA: 19.62/20)

Nemooneh Bagher Al-Olum High School, Sabzevar, Iran (Ranked 1st)

3. Other education and expertise

- Research sabbatical at Chalmers University of Technology, Sweden (2018)

Research sabbatical in surface chemistry group of **Professor Krister Holmberg** and **Dr. Romain Bordes** at Chalmers University of Technology (Göteborg, Sweden). We focused on the combinations of a viscoelastic surfactant (VES) and different types of the modified silica nanoparticles, varying both in size and in surface properties, in particular the degree of hydrophobicity for petroleum fracturing. AkzoNobel Specialty Chemicals, which is the world's largest producer of colloidal silica, was a partner in the project. I did most of the experimental work at Chalmers University of Technology but I also performed measurements at AkzoNobel's site in Stenungsund, Sweden.

- Research sabbaticals at Universitat Regensburg, Germany (2014-2015, and 2017)

Research sabbatical at solution chemistry group of **Prof. Werner Kunz**; We have published 5 scientific papers together and this collaboration has been continued since 2014 until now. We have investigated the below topics:

- Working on a new class of surfactants based on weak interactions between the surfactant polar head and the surfactant hydrophobic tail induced by the superchaotropic effect of polyoxometalates ($H_3PW_{12}O_{40}$, $H_3PMo_{12}O_{40}$, $H_4SiW_{12}O_{40}$, $H_6P_2W_{18}O_{62}$, $H_4PMo_{11}VO_{40}$) and glycol ethers using DLS, SLS and SAXS experiments.
- Using different phosphate compounds as HYDROTROPE to solubilize proteins in aqueous solutions. We focused on the effect of different phosphates, drugs, and polyoxometalates on the precipitation and aggregation of lysozyme, egg-white and amyloid β-peptides associated with Alzheimer's disease. This work is in progress now, in collaboration with **Prof. Anthony A. Hyman's group** at the Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany. We are convinced that we can make at least two landmark research papers in international peer-reviewed journals out of these prestigious scientific results.
- Nanostructuring in ethanol/"ethanolotrope"/rapeseed oil automotive biofuels as a surfactant-free microemulsion system using DLS, SLS, SAXS and SANS experiments.
- Effects of sucrose and Hofmeister salt series on the phase behavior of ternary mixtures of water, hydrocarbon and glycol ether. The appearing Winsor phases (Winsors I, II, III and IV) and their evolution was studied by sketching the perpendicular and horizontal asymptotes to the realms-of-existence of the Winsor III phase. Effect of organic and inorganic salts on the lower and upper critical solution temperatures (LCST and UCST, respectively) was also studied.

4. Language skills

- Native language: Farsi (Persian)
- Other language skills: Fluent in English (International experience in Sweden and Germany)

5. Current employment

- Assistant Professor, School of Petroleum and Chemical Engineering, Hakim Sabzevari University, Sabzevar, Iran. (2015–present)

6. Previous work experience

- Research sabbatical at Chalmers University of Technology, Sweden (2018)
- Research sabbaticals at Universitat Regensburg, Germany (2017)
- Research sabbaticals at Universitat Regensburg, Germany (2014-2015)
- Research Assistant in Industry, Surfactant – EOR Research Team, IOR Research Institute, National Iranian Oil Company (NIOC), Tehran, Iran (2012–2014). We Performed routine and special experiments such as PVT, thermal stability and compatibility, phase behaviour, high-pressure high-temperature adsorption tests
- Research Assistant, Institute of water, environment and Energy, Sharif University of Technology, Technical and environmental Inspection (2008–2012)
- Research Assistant, Petroleum University of Technology, Ahwaz, Iran, Numerical modelling and methods in chemical engineering (2007-2008)
- Organizer committee member of 8th International Seminar on Polymer Science & Technology (ISPST 2007), Sharif University of Technology, Iran (2007)

7. Career breaks

- Baby birthday (Oct 2018, 2 months)

8. Research funding and grants

- Research grant provided by Universitat Regensburg, Germany (2017)
- Research grant provided by Chalmers University of Technology, Sweden (2018)
- Research grant provided by German Academic Exchange Service (DAAD), Germany (2015)
- Full fund scholarship for the PhD degree from Iran Ministry of Science, Research & Technology MSRT (2014),
- Ranked 2rd in class during M.Sc. degree at the Petroleum University of Technology, Tehran, Iran.
- Ranked 1st in class during diploma degree.
- Outstanding professor in research and education at Hakim Sabzevari University (2018 and 2019)

9. Research output

- Total number of publications

(Note: The ten most important publications for the research plan are highlighted in yellow)

1) E. Razavi, **A. Khoshsima**, R. Shahriari, *Phase Behavior Modeling of Mixtures Containing N-, S- and O-Heterocyclic Compounds Using PC-SAFT Equation of State,* **Industrial & Engineering Chemistry Research I&EC** 58 (2019) 11038-11059, ACS Publications, (https://doi.org/10.1021/acs.iecr.9b01429)

2) J. Mehringer, T. Do, D. Touraud, M. Hohenschutz, **A. Khoshsima**, D. Horinek, W. Kunz, *Hofmeister vs. Neuberg - Is ATP really a biological hydrotrope?* **Cell Reports Physical Science**, 100343 (https://doi.org/10.1016/j.xcrp.2021.100343)

3) **A. Khoshsima**, M.R. Dehghani, *Vapor–liquid and liquid–liquid equilibrium calculations in mixtures containing non-ionic glycol ether surfactant using PHSC equation of state*, **Fluid Phase Equilibria** 377 (2014) 16-26 (http://dx.doi.org/10.1016/j.fluid.2014.05.041)

4) **A. Khoshsima,** R. Shahriari, *Molecular modeling of systems related to the biodiesel production using the PHSC equation of state*, **Fluid Phase Equilibria** 458 (2018) 58-83, 2017

5) **A. Khoshsima**, R. Shahriari, *Modeling study of the phase behavior of mixtures containing non – ionic glycol ether surfactant*, **Journal of Molecular Liquids** 230 (2017) 529 – 541, (http://dx.doi.org/10.1016/j.molliq.2017.01.058)

6) **A. Khoshsima**, M.R. Dehghani, *Phase behavior of glycol ether surfactant systems in the presence of brine and hydrocarbon: Experiment and modeling*, **Fluid Phase Equilibria**, 414 (2016) 101-110 (http://dx.doi.org/10.1016/j.fluid.2016.01.019)

7) **A. Khoshsima**, M.R. Dehghani, D. Touraud, W. Kunz, *Effects of salts and sucrose on the phase behavior of ternary mixtures of water, decane, and mono-ethylene glycol butyl ether*, **Colloids and Surfaces A: Physicochemical and Engineering Aspects** 477 (2015) 19-25 (http://dx.doi.org/10.1016/j.colsurfa.2015.03.017)

8) **A. Khoshsima**, M.R. Dehghani, D. Touraud, W. Kunz, *An investigation of the fish diagrams of water or brine/decane or dodecane/propylene glycol ether (C_3P_1 or C_3P_2) systems*, **Journal of Molecular Liquids** 206 (2015) 170-175 (http://dx.doi.org/10.1016/j.molliq.2015.02.016)

9) P. Schmid, T. Buchecker, **A. Khoshsima**, D. Touraud, O. Diat, W. Kunz, A. Pfitzner, P. Bauduin, *Self-assembly of a short amphiphile in water controlled by superchaotropic polyoxometalates: $H_4SiW_{12}O_{40}$ vs. $H_3PW_{12}O_{40}$* **Journal of Colloid and Interface Science** 587 (2021) 347-357 (https://doi.org/10.1016/j.jcis.2020.12.003)

10) T. ShenavaeiZare, **A. Khoshsima**, B ZareNezhad, *Development of surfactant-free microemulsion hybrid biofuels employing halophytic salicornia oil/ethanol and oxygenated additives*, **Fuel** 292, 120249 (https://doi.org/10.1016/j.fuel.2021.120249)

11) **A. Khoshsima**, R. Bordes, H. Oskarsson, A. Sundblom, M. Persson, K. Holmberg, the rheology and surface chemistry of *nanosilica / Viscoelastic Surfactant (VES) formulations for petroleum reservoir fracturing* (In progress)

12) S. H. Hajiabadi, P. Bedrikovetsky, H. Mahani, **A. Khoshsima**, H. Aghaei, M. Kalateh-Aghamohammadi, S. Habibi, *Effects of surface modified nanosilica on drilling fluid and formation damage*, **Journal of Petroleum Science and Engineering** 194 (2020) 107559 (https://doi.org/10.1016/j.petrol.2020.107559)

13) **A. Khoshsima**, D. Brock, D. Touraud, W. Kunz, *Pre-formulation of biofuels: Kinematic viscosities, low-temperature phase behaviour and nanostructuring of ethanol/"ethanolotrope"/rapeseed oil mixtures*, **Fuel** 191 (2017) 212-220, (http://dx.doi.org/10.1016/j.fuel.2016.11.075)

14) D. Brock, T. Lopian, **A. Khoshsima**, P. Bauduin, O. Diat, D. Touraud, W. Kunz, *Nanostructuring in ethanol/"ethanolotrope"/rapeseed oil automotive biofuels*, **Colloid and Interface Science Communications**, 14 (2016) 1-3 (http://dx.doi.org/10.1016/j.colcom.2016.07.001)

15) **A. Khoshsima**, M.R. Dehghani, D. Touraud, J. Marcus, O. Diat, W. Kunz, *Nanostructures in clear and homogeneous mixtures of rapeseed oil and ethanol in the presence of green additives*, **Colloid and Polymer Science** 293 (2015) 3225-3235 (http://dx.doi.org/10.1007/s00396-015-3765-7)

16) T. Shenavaei Zare, **A Khoshsima**, B ZareNezhad, *Production of New Surfactant-free Microemulsion Biofuels: Phase Behavior and Nanostructure Identification,* **Energy & Fuels** 34 (4), 4643-4659 (https://pubs.acs.org/doi/abs/10.1021/acs.energyfuels.9b04430)

17) **A.Khoshsima**, A. Hosseini, *Prediction of the Boyle temperature, second virial coefficient and Zeno line using the cubic and volume – translated cubic equations of state*, **Journal of Molecular Liquids,** Available online: 18 July 2017 (https://doi.org/10.1016/j.molliq.2017.07.064)

18) H. Sedaghatzadegan Esfahani, **A. Khoshsima**, Gh. Pazuki, *Choline chloride-based deep eutectic solvents as green extractant for the efficient extraction of 1-butanol or 2-butanol from azeotropic n-heptane + butanol mixtures*, **Journal of Molecular Liquids** 313 (2020) 113524

19) M. Rezakazemi, A. Ghafarinazari, S. Shirazian, **A. Khoshsima**, *Numerical Modeling and Optimization of Wastewater Treatment Using Porous Polymeric Membranes*, **Polymer Engineering & Science** 53 (2013) 1272–1278 (http://dx.doi.org/10.1002/pen.23375)

20) H. Sedaghatzadegan Esfahani, **A. Khoshsima**, Gh. Pazuki, *Experimental Study and Thermodynamic Modeling of Separation of Toluene from Heptane by a Deep Eutectic Solvent*, Journal of Separation Science and Engineering 12, Issue 2 (2021) 18-30 (DOI: 10.22103/JSSE.2020.2687)

21) **A. Khoshsima**, M. Dehghani, H. Gholamianpour, *An Investigation on the Gemini and Amphoteric Surfactants for Chemical Flooding in High-Salinity, High-Temperature Carbonate Reservoirs*, Presented at the 8th International Chemical Engineering Congress and Exhibition, Iran, (IChEC 2014)

22) **A. Khoshsima**, M. Dehghani, *Study on phase behavior of crude oil in the presence of surfactant and brine*, presented at the 14th National Chemical Engineering Congress and Exhibition, Iran, (Tehran, 2013)

23) **A. Khoshsima**, R. Behbahani and M. Moshfeghian, *Modeling and Modification of Maddox et al. Method for Estimation of Water Content of Sour Natural Gas*, Conference paper, Tokyo, Japan 2010

24) **A. Khoshsima**, A. Kazemi beydokhti, *Biofuel nanostructures*, 2nd international conference on application of novel technologies in engineering, Mashhad, 2016 (in Persian)

- Design and manufacturing of microchannels for separation in aqueous two-phase systems (ATPSs), manufacturing certificate by Hakim Sabzevari University, Iran 2020.

10. Research supervision and leadership experience

- Supervisor of more than 50 undergraduate
- Supervisor/Advisor of 5 postgraduate students (1 PhD and 4 MSc)
- Leadership experience in industrial project entitled "Analysing heating value and other operational properties of furnaces in Sabzevar cement factory", Sabzevar Lar Cement Co., Sabzevar, Iran (2020-present)

11. Teaching merits

- Thermodynamics I and II,
- Physical chemistry,
- Basic principles and calculations in chemical engineering,
- Multiphase distillation,
- Numerical methods for engineers,
- Programming software for engineers (MATLAB)
- Heat transfer,
- English for petroleum and chemical engineers

12. Awards and honours

- Research grant provided by Universität Regensburg, Germany (2017)
- Research grant provided by Chalmers University of Technology, Sweden (2018)
- Research grant provided by German Academic Exchange Service (DAAD), Germany (2015)
- Full fund scholarship for the PhD degree from Iran Ministry of Science, Research & Technology MSRT (2014),
- Ranked 2nd in class during M.Sc. degree at the Petroleum University of Technology, Tehran, Iran.
- Ranked 1st in class during diploma degree.
- Outstanding professor in research and education at Hakim Sabzevari University (2018 and 2019)

13. Other key academic merits:

- Organizer committee member of 8th International Seminar on Polymer Science & Technology (ISPST 2007), Sharif University of Technology (2007)
- Referee for scientific publications and Journals:
  - Fuel

- Journal of Molecular Liquids
- Nature Scientific Reports
- Journal of Chemical & Engineering Data -ACS Publications
- Industrial & Engineering Chemistry Research (I&EC) - ACS Publications
- Process Biochemistry
- Energy Conversion and Management

- group Administrative positions at Hakim Sabzevari University (2019-present)
- Corresponding international administrator position at Hakim Sabzevari University (2018-present)
- Acting as pre-examiner or opponent of different doctoral dissertation
- Memberships in doctoral dissertation committees or boards

14. Scientific and societal impact

- Over 8 years professional and research experience in applied thermodynamics, Thermodynamic modelling of complex systems, Phase behaviour,
- Surfactants, self-assembly, aggregations, and nanostructuring characterization using conductivity, DLS, SLS, SAXS and SANS measurements.
- Proficient in computer programming (Visual Basic, MATLAB, DELPHI), and skilled in working with commercial process simulators (PVTi, Pro II, ASPEN-HYSYS, PVT-sim)
- Analytical and problem-solving skills developed through team-based engineering projects.
- International teamwork experience in Germany and Sweden and highlighted publications during these research communications

15. Other merits

- Thermodynamics of non-ideal complex solutions,
- Non-equilibrium thermodynamics,
- Thermodynamics of electrolyte solutions,
- Thermodynamic modelling including VLE, LLE and SLE systems (using PC-SAFT, Perturbed Hard Sphere Chain (PHSC), extended UNIQUAC EoS, G^E models …)
- Computer programming (Visual Basic, MATLAB, DELPHI)
- Equations of state (SAFT, PC-SAFT…), alpha functions, osmotic coefficient
- Surface phenomena (surface and interfacial tension, aggregation behavior and micellization of surfactants, Microemulsions, surfactant applications, surfactant phase behaviour, enhanced oil recovery …)
- Salting-in and salting-out effect