

Xiaoli Tan, Ph. D

Institute for Oil Sands Innovation, University of Alberta, Edmonton, Alberta T6G 1H9 Canada

(780) 492-5251 xiaolit@ualberta.ca

https://www.researchgate.net/profile/Xiaoli_Tan2/stats

EDUCATION

Chinese Academy of Sciences	Beijing, China
PhD, Physical Chemistry with specialization of colloid chemistry	2005
Thesis: Development of polyaromatic surfactants-based floods for enhanced oil recovery in China oil fields	
Inner Mongolia University	Hohhot, China
BSc, Applied Chemistry	2000

PROFESSIONAL EXPERIENCE

Research Associate	2009 – present
Institute for Oil Sands Innovation (IOSI), University of Alberta	Edmonton, AB

- Work with Scientific Director, manager, PIs, and project coordinators to develop, implement and monitor the annual and medium term scientific projects, plans, and programs to meet overall strategic objects and deadlines.
- Lead and manage the planning and implementation of multiple IOSI research projects.
- Perform detailed management of the design, documentation and implementation of complex research projects.
- Champion, lead, and manage the operationalization and implementation of new research projects
- Liaise and manage relationships with academic and industry partners, develop collaborative research protocols that meet academic, industry and funding requirements.
- Monitor the ongoing processes of grant development & administration, submission, review and notification.
- Investigate and pursue grant and industry opportunities to support the sustainability of the IOSI research program.
- Develop communication strategies for the presentation of research findings to the academic community and potential collaborators.
- Identify and engage with individual experts and informational resources nationally and internationally.

Key Achievements:

- Led IOSI technical team (two full-time research technicians and numbers of research assistants) to provide high quality scientific support to ~ 20 IOSI research projects/year across Canada and internationally.
- Established nine research projects as PI or co-PI in the research themes of non-aqueous extraction of bitumen, bitumen and minerals characterization, and tailings processing fundamental.

- Built/developed/managed IOSI in-house research projects portfolio to address IOSI and industrial partners' strategic needs.
- Supervised and co-supervised 11 graduate students and research assistants.

Laboratory Manager

2011 – present

Institute for Oil Sands Innovation (IOSI), University of Alberta

Edmonton, AB

- Manage IOSI research facilities, oversee IOSI laboratory daily operation.
- Develop and oversee annual IOSI laboratory operational budget.
- Recruit and oversee research technicians and lab assistants.
- Coordinate the facilities, space, and schedule with IOSI laboratory users, and provide a safe and healthy working environment to all laboratory users (60-80 users/year).
- Development of new experimental methods, application of standard methods, selection, procurement, installation and calibration of research equipment.
- Train graduate students, research technicians and other researchers in analytical and experimental methods.
- Assists PIs/researchers in identifying equipment needs, seeking equipment funding sources, and procuring equipment.

Key Achievements:

- Ensured the safe and smooth operations of the IOSI lab equipment/facilities and the timely unwavering quality support to IOSI projects and hundreds of lab users.
- Built and extended the capacity of technical supports to a wide range of oil sands research through securing equipment funding, procurement and construction of dedicated instruments including oil sands tailings treatment facility, particle size analysis (Mastersizer 3000, FBRM G400), rheometer (Malvern Kinetic Lab+), TGA-FTIR, tensiometer (Krüss K100), atomic force microscopy (Bruker Innova), isothermal titration calorimetry (TAM III) etc.

Postdoctoral Research Fellow

2005 – 2008

Department of Chemical and Materials Engineering, University of Alberta

Edmonton, AB

- Project Leader for asphaltene chemistry.
- Investigated the chemical structures, nano-aggregates, adhesion and nanomechanical properties of asphaltenes on minerals in organic solvents and bitumen using advanced analytical techniques.

Key Achievements:

- Used low-cost methodologies to design and synthesize models of asphaltenes and resins.
- As one of four members to propose supramolecular assembly model for aggregation of petroleum asphaltenes, which is widely recognized by academia and industry.

Research Assistant

2001 – 2005

Technical Institute of Physics and Chemistry, Chinese Academy of Sciences

Beijing, China

- Designed and synthesized alkyl-polyaromatic surfactants.
- Investigated the phase behaviour and microstructures of surfactants systems.
- Formulated surfactant floods for enhanced oil recovery.

Key Achievements:

- Established chemical structure/performance relationship in alkyl-polyaromatic surfactants.
- Developed the application of alkylnaphthalene sulfonates for enhanced oil recovery.

RESEARCH SUPPORT (SINCE 2013)

PIs	Title of proposal	Funding source	Amount per year (\$)	Years of tenure
<u>Xiaoli Tan</u> ; Q. Liu	CO ₂ -assisted paraffinic froth treatment.	Imperial Oil Ltd. NSERC CRD	91,420 91,420	2017 2018
Q. Liu; <u>Xiaoli Tan</u>	Maintaining permeability for continuous mature fine tailings dewatering	COSIA NSERC CRD	93,086 93,086, 93,086	2017 2018 2019
J. Zhou; H. Li; Q. Liu; <u>Xiaoli Tan</u>	Why are high flocculant dosages needed to dewater MFT: effect of mineralogy	COSIA InnoTech Alberta	100,000 100,000 100,000	2017 2018 2019
Q. Liu; <u>Xiaoli Tan</u>	NAE bitumen cleaning using functionalized magnetic particles	Imperial Oil Ltd. Future Energy System	98,000 100,000 100,000 100,000 100,000	2016 2017 2018 2019 2020 2021
Q. Liu; <u>Xiaoli Tan</u>	NAE bitumen cleaning using hydrothermal treatment and filtration	Future Energy System	175,000 100,000 100,000 100,000	2017 2018 2019 2020
H. Zeng; <u>Xiaoli Tan</u>	Characterize molecular and surface interaction mechanisms of bitumen and asphaltenes with minerals, water in solvents	Future Energy System	84,500 119,00 100,00 95,000	2017 2018 2019 2020
H. Zeng; Q. Liu; <u>Xiaoli Tan</u>	Behavior of bitumen-coated fine solids in organic solvents with AFM, SFA and other advanced interfacial methodologies	Alberta Innovates Imperial Oil Ltd.	125,000 125,000 125,000	2015 2016 2017
<u>Xiaoli Tan</u> ; Q. Liu; P. Choi	Two-stage chemical treatment for rapid dewatering of oil sands tailings	Imperial Oil Ltd. Natural Resources Canada	90,000 170,000 200,154	2013 2014 2015
Q. Liu; P. Choi; <u>Xiaoli Tan</u>	Geopolymerization and mineral hydration to strengthen oil sands tailings sludge	COSIA Imperial Oil Ltd.	80,000 80,000	2014 2015

ARTICLES IN REFEREED PUBLICATIONS (Students; contribution as project PI or Co-PI *)

1. **J. Liu, J. Wang, J. Huang, X. Cui, Xiaoli Tan***, Q. Liu, H. Zeng "Heterogeneous Distribution of Adsorbed Bitumen on Fine Solids from Solvent-based Extraction of Oil Sands Probed by AFM" Energy Fuels, 2017. DOI: 10.1021/acs.energyfuels.7b00396

2. **R. Loerke**, [Xiaoli Tan*](#), Q. Liu "Dewatering of Oil Sands Mature Fine Tailings by Dual Polymer Flocculation and Pressure Plate Filtration" Energy Fuels, 2017, 31, pp. 6986-6995.
3. **Y. Zhu**, [Xiaoli Tan*](#), Q. Liu "Dual Polymer Flocculants for Mature Fine Tailings Dewatering" Canadian Journal of Chemical Engineering 2017, 95, pp.3-10.
4. S. Wang, Q. Liu, [Xiaoli Tan](#), C. Xu, M. R. Gray " Adsorption of asphaltenes on kaolinite as an irreversible process" Colloids and Surfaces A: Physicochemical and Engineering Aspects 2016, 504, pp. 280-286.
5. **S. Nusri**, [Xiaoli Tan*](#), P. Choi, Q. Liu "Using Surface Geopolymerization Reactions to Strengthen Athabasca Oil Sands Mature Fine Tailings." Canadian Journal of Chemical Engineering 2016, 94, pp. 1640-1647.
6. [Xiaoli Tan](#), L. Vagi, Q. Liu, P. Choi, M. R. Gray. "Sorptions Equilibrium and Kinetics for Cyclohexane, Toluene and Water on Athabasca Oilsands Solids." Canadian Journal of Chemical Engineering 2016, 94, pp 220-230.
7. J. Mierau, N. Zhang, [Xiaoli Tan](#), A. Scherer, J. M. Stryker, R. R. Tykwinski, M. R. Gray "Catalytic Hydrodenitrogenation of Asphaltene Model Compounds." Energy Fuels 2015, 29, pp. 6724-6733.
8. J. Tiffany, C. Jin, J. S. Riedeman, B. C. Owen, [Xiaoli Tan](#), A. Scherer, R. R. Tykwinski, M. R. Gray, P. Slater, H. I. Kenttämäa. "Elucidation of Structural Information Achievable for Asphaltenes Via Collision-activated Dissociation of Their Molecular Ions in MSⁿ Experiments: A Model Compound Study." Fuel 2014, 133, pp. 106-114.
9. A. Noorjahan, [Xiaoli Tan](#), Q. Liu, M.R. Gray, P. Choi. "Study of Cyclohexane Diffusion in Athabasca Asphaltenes." Energy Fuels 2014, 28, pp. 1004-1011.
10. A. H. Alshareef, [Xiaoli Tan](#), C. Diner, J. Zhao, A. Scherer, K. Azyat, J. Stryker, R. R. Tykwinski, M. R. Gray. "Binary Interactions in Coke Formation from Model Compounds and Asphaltenes." Energy Fuels 2013, 28, pp. 1692-1700.
11. S. Wang, Q. Liu, [Xiaoli Tan](#), C. Xu, M. R. Gray. "Study of Asphaltene Adsorption on Kaolinite by X-ray Photoelectron Spectroscopy and Time-of-Flight Secondary Ion Mass Spectroscopy." Energy Fuels 2013, 27, pp. 2465 -2473.
12. M. Leonardo, S. R. Stoyanov, S. Gusarov, [Xiaoli Tan](#), M. R. Gray, J. M. Stryker, R.R. Tykwinski, J. W. Carneiro, P. R. Seidl, A. Kovalenko. "Density Functional Theory Investigation of the Contributions of π - π Stacking and Hydrogen-bonding Interactions to the Aggregation of Model Asphaltene Compounds." Energy Fuels 2012, 26, pp. 2727-2735.
13. S. Y. Hamedi, Y. Maham, [Xiaoli Tan](#), T. Babadagli, M. R. Gray. "Enhancement of the Efficiency of In Situ Combustion Technique for Heavy-Oil Recovery by Application of Nickel Ions." Fuel 2013, 105, pp. 397-407.
14. A. H. Alshareef, A. Scherer, [Xiaoli Tan](#), K. Azyat, J. M. Stryker, R. R. Tykwinski, M. R. Gray "Effect of Chemical Structure on the Cracking and Coking of Archipelago Model Compounds Representative of Asphaltenes." Energy Fuels 2012, 26, pp. 1828-1843.
15. L. M. da Costa, S. Hayaki, S. R. Stoyanov, S. Gusarov, [Xiaoli Tan](#), M. R. Gray, J. M. Stryker, R. R. Tykwinski, W. de M. Carneiro, H. Sato, P. R. Seid, A. Kovalenko "3D-RISM-KH Molecular Theory of Solvation and Density Functional Theory Investigation of the Role of Water in the Aggregation of Model Asphaltenes." Phys. Chem. Chem. Phys. 2012, 14, pp. 3922-3934.
16. M. R. Gray, R. R. Tykwinski, J. M. Stryker, [Xiaoli Tan](#) "Supramolecular Assembly Model for Aggregation of Petroleum Asphaltenes." Energy Fuels 2011, 25, pp. 3125-3134.
17. B. C. Owen, J. Gao, D. J. Borton, L. M. Amundson, E. F. Archibold, [Xiaoli Tan](#), K. Azyat, R. R. Tykwinski, M. R. Gray, H. I. Kenttämäa "Carbon Disulfide Reagent Allows the Characterization of Nonpolar Analytes by Atmospheric Pressure Chemical Ionization (APCI) Mass Spectrometry." Rapid Communications in Mass Spectrometry 2011, 25, pp. 1924-1928.
18. **W. Liu**, **Y. Jin**, [Xiaoli Tan*](#), A. Yeung "Altering the Wettability of Bitumen-Treated Glass Surfaces with Anionic and Cationic Surfactants." Fuel 2011, 90, pp. 2858-2862.
19. A. H. Alshareef, A. Scherer, [Xiaoli Tan](#), K. Azyat, J. M. Stryker, R. R. Tykwinski, M. R. Gray "Formation of Archipelago Structures during Thermal Cracking Implicates a Chemical Mechanism for the Formation of Petroleum Asphaltenes." Energy Fuels 2011, 25, pp. 2130-2136
20. G. P. Dechaine, Y. Maham, [Xiaoli Tan](#), M. R Gray "Regular Solution Theories Are Not Appropriate for Model Compounds for Petroleum Asphaltene." Energy Fuels 2011, 25, pp. 737-746

21. D. Borton, D. S. Pinkston, M. R. Hurt, [Xiaoli Tan](#), K. Azyat, A. Scherer, R. R. Tykwinski, M. R. Gray, K. Qian, H. I. Kenttmaa "Molecular Structures of Asphaltenes Based on the Dissociation Reactions of Their Ions in Mass Spectrometry." Energy Fuels 2010, 24, pp. 5548–5559.
22. H. Sabbah, A. L. Morrow, A. E. Pomerantz, O. C. Mullins, [Xiaoli Tan](#), M. R. Gray, K. Azyat, R. R. Tykwinski, R. N. Zare "Comparing Laser Desorption/Laser Ionization Mass Spectra of Asphaltenes and Model Compounds." Energy Fuels 2010, 24, pp. 3589–3594.
23. D. S. Pinkston, P. Duan, V. A. Gallardo, S. C. Habicht, [Xiaoli Tan](#), K. Qian, M. R. Gray, K. Mullen, H. I. Kenttmaa "Analysis of Asphaltenes and Asphaltene Model Compounds by Laser-Induced Acoustic Desorption/Fourier Transform Ion Cyclotron Resonance Mass Spectrometry." Energy Fuels 2009, 23, pp. 5564–5570.
24. [Xiaoli Tan](#), H. Fenniri, M. R. Gray "Effect of Water on Models of Asphaltenes in Organic Solution." Energy Fuels 2009, 23, pp. 3687–3693.
25. C. Yin, [Xiaoli Tan](#), M. R. Gray "Associative π - π Interactions of Condensed Aromatic Compounds with Vanadyl or Nickel Porphyrin Complexes Are Not Observed in the Organic Phase." Energy Fuels 2008, 22, pp. 2465–2469.
26. [Xiaoli Tan](#), H. Fenniri, M. R. Gray "Chains of Aromatics as Models for Asphaltenes: Synthesis & Characterization of a Bipyridyl Derivative." Energy Fuels 2008, 22, pp. 715–720.
27. [Xiaoli Tan](#), L. Zhang, S. Zhao, W. Li, J. Ye, J. Yu, J. An. "Aggregation of Sodium 1-(n-Alkyl) Naphthalene-4-Sulfonates in Aqueous Solution: Micellization and Microenvironment Characteristics." Langmuir 2004, 20, pp. 7010–7014.
28. [Xiaoli Tan](#), L. Zhang, S. Zhao, J. Yu, J. An. "The Synthesis and Study of Surface Properties of Long-Chain Alkyl naphthalene Sulfonates." J. Surfactants Deterg. 2004, 7, pp. 135–139.
29. H. Yuan, [Xiaoli Tan](#), L. Zhang, S. Zhao, J. An, J. Yu. "Micellization of Sodium Decyl Naphthalene Sulfonate Studied by ¹H NMR." J. Phys. Chem. B 2003, 107, pp. 3644–3649.
30. X. Yang, [Xiaoli Tan](#), H. Yuan, S. Zhao, J. Yu, Y. Du. "Mixed Micelles of Sodium 4-Decyl Naphthalene Sulfonate with Triton X-100 and Sodium Dodecyl Sulfonate Analyzed by ¹H NMR." Journal of Colloid and Interface Science 2004, 279, pp. 533–538.
31. X. Yang, H. Gao, [Xiaoli Tan](#), H. Yuan, G. Cheng, S. Mao, S. Zhao, L. Zhang, J. An, J. Yu, Y. Du. "Difference in Micellar Properties of Sodium Decyl Naphthalene Sulfonate in D₂O Solution Studied by ¹H NMR Relaxation and 2D NOESY." Colloid and Polymer Science 2004, 282, pp. 280–284.
32. Y. Chu, Y. Gong, [Xiaoli Tan](#), L. Zhang, S. Zhao, J. An, J. Yu. "Studies of Synergism for Lowering Dynamic Interfacial Tension in Sodium α -(n-alkyl) Naphthalene Sulfonate/Alkali/Acidic Oil Systems." Journal of Colloid and Interface Science 2004, 276, pp. 182–187.
33. [Xiaoli Tan](#), Z. Xu, J. An. "Synthesis of Branched 1-Alkyl naphthalenes and Sodium 1-Alkyl naphthalene-4-Sulfonates." Fine Chemicals (China) 2004, 21, z1, pp. 44–46.
34. X. Yang, [Xiaoli Tan](#), H. Yuan, S. Mao, S. Zhao, L. Zhang, J. An, J. Yu, Y. Du "Dynamic of Sodium 4-Decyl Naphthalene Sulfonate Molecules in Micelles Studied by ¹H NMR Relaxation." Chinese Journal of Spectroscopy 2003, 20, pp. 229–233.
35. G. Aodeng, [Xiaoli Tan](#), Y. Sai "Study on the Color Reaction of Titanium (IV) with 3,5-Dibromosalicylfluorone and Tween-60." Metallurgical Analysis (China) 2001, 21, pp. 20–22.