

MINWEI SUN

922 San Leandro Ave Suite H, Mountain View, CA 94043 Tel. 650-961-3510 msun@rerinst.org

SUMMARY OF QUALIFICATIONS

Experienced chemical engineering researcher with expertise in flow assurance (especially on gas hydrate and asphaltene) and improved oil recovery. Extensive technical knowledge and experiences in surfactant, emulsions, colloid, polymer, nano materials, anti-corrosion, surface engineering and waterflooding. Major contributor and co-author of 4 patents and more than 20 peer-reviewed publications.

RESEARCH EXPERIENCE

Research Scientist at Reservoir Engineering Research Institute (2010 ~ present)

- Design & conduct experiments with the focus on flow assurance and improved oil recovery (IOR) in collaboration with petroleum companies
 - Discovering new generation of gas hydrate anti-agglomerants for wide range watercuts (patent filed)
 - Validating high pressure rocking sapphire cell setup for gas hydrate testing
 - Investigating asphaltene dispersants
 - Developing a better understanding of gas hydrate anti-agglomeration, including the effect of brine salinity, cosurfactants and surfactant blends
 - Investigating and solving the problems of tight w/o emulsions in a Middle-east reservoir
- Provide quarterly research progress report and project consultations to RERI member companies, including Chevron, ConocoPhillips, TOTAL, ExxonMobil, Lubrizol, et al
- Present project progress to member companies in the RERI annual workshop
- Mentoring several young engineers

Graduate student researcher at University of California, Riverside (2004 ~ 2009)

- Developed a robust method to prepare ultra-low- k thin films from zeolite nanoparticles funded by Intel and NSF (Gold medal award)
- Developed a new dielectric constant measurement method
- Invented a new anti-corrosion coating
- maintained laboratory instruments for 3 years

Graduate student researcher in Tsinghua University, China (2001 ~ 2004)

- Synthesized polyelectrolyte hydrogel with controllable absorbing capability by using different crosslinking agents
- Studied the phase-separation in composite polymer membranes

EDUCATION

University of California, Riverside	PhD in Chemical Engineering, <i>Aug. 2009</i>
Tsinghua University, China	Bachelor & Master in Materials Science and Engineering

TECHNICAL SKILLS

- Gas hydrate inhibition testing in high pressure setups (rocking cell and autoclave)
- Asphaltene dispersant screening
- Coreflooding test and analysis for IOR
- Glass micromodel flooding test for IOR
- Electrochemical corrosion tests
- Nano crystal, single crystal and thin film preparation
- Polymer synthesis
- Characterization skills including SEM, TEM, TGA, XRD, BET, DLS, GC, LC, UV-Vis, FTIR, etc
- Experimental design and data analysis

HONORS

- 2008** Phi Beta Kappa International Scholarship (for outstanding international graduate student, by Phi Beta Kappa Alumni, southern California)
- 2007** Gold Medal Award, Electronics and Communications, Pioneering Micro and Nano Technology Competition (international award for leading group)

RECENT ORAL PRESENTATION

- 1) "New Hydrate Anti-agglomerant Formulation for Offshore Flow Assurance and Oil Capture", ***Offshore Technology Conference (SPE)***, May 5-8, 2014, Houston, TX
- 2) "Effect of Salt Species on Hydrate Anti-agglomeration of an Effective Non-ionic Surfactant", ***AIChE Annual Meeting***, Nov 3-8, 2013, San Francisco, CA
- 3) "Effectiveness of Alcohol Cosurfactants in Hydrate Anti- agglomeration", ***MCE Deepwater Development World Forum***, March 26-28, 2012, Paris, France

PATENTS

- 1) A. Firoozabadi, **M. Sun**, A. Mastrangelo, Z.Y. Chang. "Gas Hydrate Inhibitors", *US Application with Lubrizol, PCT/US2014/58854*, 2014
- 2) Y. Yan, R. Cai, **M. Sun**. "Ambient Pressure Synthesis of Zeolite Films and Their Applications as Corrosion Resistant Coatings", *US 201001 19736A1*, 2009
- 3) X. Xie, J. Zhang, **M. Sun**, L. Zhang. "Preparation of High Water-Absorbent Resin", *CN 1535991A*, 2004
- 4) X. Xie, J. Zhang, **M. Sun**, L. Zhang. "Synthesis of a Novel Crosslinking Agent and Super-Absorbent Polymer Crosslinked by it", *CN 1344756A*, 2002

BOOK CHAPTERS

- 1) C. M. Lew, **M. Sun**, Y. Liu, and Y. Yan, 2008. "Pure-Silica-Zeolite Low-Dielectric Constant

Materials" in Ordered Porous Solids: Recent Advances and Prospects, Edited by V. Valtchev, S. Mintova, and M. Tsapatsis, Elsevier

PUBLICATIONS

- 1) **M. Sun**, K. Mogensen, A. Firoozabadi. "Improved Oil Recovery Performance of Unusual Crudes which Form Tight W/O Emulsions with Brines", in preparation, 2015
- 2) **M. Sun**, A. Firoozabadi. "New Hydrate Anti-agglomerant Formulation for Offshore Flow Assurance and Oil Capture", in preparation, 2015
- 3) **M. Sun**, A. Firoozabadi. "Effectiveness of Surfactant Blends in Hydrate Anti-agglomeration and Kinetics", in preparation, 2015
- 4) **M. Sun**, A. Firoozabadi. "Gas Hydrate Powder Formation - Ultimate Solution for Natural Gas Flow Assurance", *FUEL*, available online, 2015
- 5) **M. Sun**, A. Firoozabadi, G. Chen, C. Yu. "Hydrate Size Measurements in Anti-agglomeration at High Watercut by New Formulation", under review, 2015
- 6) **M. Sun**, A. Firoozabadi. "Natural Gas Hydrate Particles in Oil-Free Systems with Kinetic Inhibition and Slurry Viscosity Reduction", *Energy & Fuel*. Vol 28(3), 1890~1895, 2014
- 7) **M. Sun**, A. Firoozabadi. "New Chemical for Hydrate Anti-agglomeration in Hydrocarbon Flowlines and Seabed Oil Capture", *Journal of Colloid and Interface Science*, Vol. 402, 312~319, 2013
- 8) **M. Sun**, Y. Wang, A. Firoozabadi. "Effectiveness of Alcohol Cosurfactants in Hydrate Anti-agglomeration", *Energy & Fuel*. Vol. 26(9), 5626~5632, 2012
- 9) **M. Sun**, Heather K. Hunt, Christopjer M. Lew, etc. "A Dynamic Organic Structuring-Directing Agent for Pure-Silica-Zeolite AST and LTA Syntheses", *Chinese Journal of Catalysis*, Vol. 33, 85~91, 2012
- 10) N. Kinsinger, A. Tantuccio, **M. Sun**, etc. "Photocatalytic titanium dioxide composite", *J Nanosci Nanotechnol*. Vol. 11(8), 7015~7021, 2011
- 11) C. M. Lew, Y. Liu, D. Kisailus, G. M. Kloster, G. Chow, B. Boyanov, **M. Sun**, etc. "Insight into On-Wafer Crystallization of Pure-Silica-Zeolite Films through Nutrient Replenishment", *Langmuir*, Vol. 27(7), 3283~3285, 2011
- 12) H. K. Hunt, C. M. Lew, **M. Sun**, etc. "Pure-silica LTA, CHA, STT, ITW, and -SVR thin films and powders for low-k applications", *Microporous and Mesoporous Materials*, Vol. 130, 49~55, 2010
- 13) H. K. Hunt, C. M. Lew, **M. Sun**, etc. "Pure-silica zeolite thin films by vapor phase transport of fluoride for low-k applications", *Microporous and Mesoporous Materials*, Vol.128, 12~18, 2010
- 14) **M. Sun**, W. Maichen, R. Pophale, etc. "Dielectric Constant Measurement of Zeolite Powders by Time Domain Reflectometry", *Microporous and Mesoporous Materials*, Vol.123, 10~14, 2009
- 15) C. M. Lew, Y. Liu, B. Day, G. M. Kloster, H. Tiznado, **M. Sun**, etc. "Hydrofluoric Acid-Resistant and Hydrophobic Pure-Silica-Zeolite MEL Low-Dielectric Constant Films", *Langmuir*, Vol.25(9), 5039~5044, 2009
- 16) Y. Liu, C. M. Lew, **M. Sun**, etc. "On-Wafer Crystallization of Ultralow-k Pure Silica Zeolite Films", *Angewandte Chemie International Edition*, Vol.48, 4777~2780, 2009
- 17) S. Gu, R. Cai, T. Luo, Z. Chen, **M. Sun**, etc. "A Soluble and Highly Conductive Ionomer for High Performance Hydroxide Exchange Membrane Fuel Cells", *Angewandte Chemie International Edition*, Vol.48, 6499~6502, 2009
- 18) T. Zhang, Q. Zhang, J. Ge, J. Goebel, **M. Sun**, etc. "A Self-Templated Route to Hollow Silica Microspheres", *The Journal of Physical Chemistry C*, Vol.113(8), 3168~3175, 2009

- 19) C. M. Lew, Z. Li, S. Li, S. Hwang, Y. Liu, D. I. Medina, **M. Sun**, etc. "Pure-Silica-Zeolite MFI and MEL Low-Dielectric Constant Films with Fluoroorganic Functionalization", *Advanced Functional Materials*, Vol.18(21), 3454~3460, 2008
- 20) **M. Sun**, Y. Liu, C. M. Lew, etc. "MEL-type Pure-silica Zeolite Nanocrystals Prepared by an Evaporation-Assisted Two-Stage Synthesis Method as Ultra-Low-k Materials", *Advanced Functional Materials*, Vol.18, 1732~1738, 2008
- 21) R. Cai, **M. Sun**, Z. Chen, etc. "Ionothermal Synthesis of Oriented Zeolite AEL Films and Their Application as Corrosion-Resistant Coatings", **VIP** paper in *Angewandte Chemie International Edition*, Vol.47(3), 525~528, 2008
- 22) UL Lao, **M. Sun**, M. Matsumoto, etc. "Genetic Engineering of Self-Assembled Protein Hydrogel Based on Elastin-like Sequences with Metal Binding Functionality", *Biomacromolecules*, Vol.8(12), 3736~3739, 2007
- 23) C. M. Lew, Z. Li, S. I. Zones, **M. Sun**, etc. "Control of Size and Yield of Pure-Silica-Zeolite MFI Nanocrystals by Addition of Methylene Blue to the Synthesis Solution" *Microporous and Mesoporous Materials*, Vol.105(1-2), 10~14, 2007
- 24) Z. Li, M. C. Johnson, **M. Sun**, etc. "Mechanical and Dielectric Properties of Pure-Silica Zeolite Low-k Materials", **VIP** paper in *Angewandte Chemie International Edition*, Vol. 45(38), 6329~6332, 2006
- 25) **M. Sun**, J. Zhang, L. Zhang, etc. "Effect of Crosslinkers on Superabsorbents", *Acta Polymerica Sinica*, 4, 595~599, 2004, (in Chinese)
- 26) J. Zhang, **M. Sun**, L. Zhang, etc. "Water Absorbency of Poly(sodium acrylate) Super-absorbents Crosslinked with Modified Poly(ethylene Glycol)s", *Journal of Applied Polymer Science*, Vol.90(7), 1851~1856, 2003
- 27) J. Zhang, **M. Sun**, L. Zhang, etc. "Improvement of Salt Resistance and Gel Strength of Super Absorbent Resin", *Petrochemical Technology*, Vol.31,993~996,2002, (in Chinese)