

## Publications from UT-PGE's "Nanoparticles for Subsurface Engineering" IAP

1. Worthen, A. J., Taghavy, A., Aroonsri, A., Kim, I., Johnston, K. P., Huh, C., Bryant, S. L., DiCarlo, D., "Multi-Scale Evaluation of Nanoparticle-Stabilized CO<sub>2</sub>-in-Water Foams: From the Benchtop to the Field", SPE Paper 175065, to be presented at SPE Annual Tech. Conf., Houston, TX, Sept. 28-30, 2015.
2. Panthi, K., Mohanty, K. K., and Huh, C., "Precision Control of Gel Formation Using Superparamagnetic Nanoparticle-Based Heating", SPE Paper 175006, to be presented at SPE Annual Tech. Conf., Houston, TX, Sept. 28-30, 2015.
3. Singh, R., Gupta, A., Mohanty, K. K., Huh, C., Lee, D., and Cho, H., "Fly Ash Nanoparticle-Stabilized Carbon Dioxide-in-Water Foams for Gas Mobility Control Applications", SPE Paper 175057, to be presented at SPE Annual Tech. Conf., Houston, TX, Sept. 28-30, 2015.
4. Rahmani, A. R., Bryant, S. L., Huh, C., Ahmadian, M., Zhang, W., and Liu, Q. H., "Characterizing Reservoir Heterogeneities Using Magnetic Nanoparticles", **SPE Paper 173195**, presented at SPE Reservoir Simulation Symp., Houston, TX, Feb. 23-25, 2015.
5. Prigiobbe, V., Ko, S., Wang, Q., Huh, C., Bryant, S. L., and Bennetzen, M. V., "Magnetic Nanoparticles for Efficient Removal of Oilfield Contaminants: Modeling of Magnetic Separation and Validation", **SPE Paper 173786**, presented at SPE Intern. Symp. Oilfield Chem., The Woodlands, TX, Apr. 13-15, 2015.
6. Prigiobbe, V., Ko, S., Huh, C., and Bryant, S. L., "Measuring and Modeling the Magnetic Settling of Superparamagnetic Nanoparticle Dispersions", **J. Colloid Interface Sci.**, **447**, 58-67 (2015).
7. Kim, I., Taghavy, A., DiCarlo, D., and Huh, C., "Aggregation of Silica Nanoparticles and Its Impact on Particle Mobility under High-Salinity Conditions", *J. Petrol. Sci. Eng.*, accepted for publication (2015).
8. Prigiobbe, V., Worthen, A. J., Aroonsri, A., Johnston, K. P., Huh, C., and Bryant, S. L., "Modeling Transport of CO<sub>2</sub> Foam Stabilized with Engineered Nanoparticles", **Transport in Porous Media**, submitted (2015).
9. Ko, S., Prigiobbe, V., Huh, C., Bryant, S. L., Bennetzen, M. V., and Mogensen, K., "Accelerated Oil Droplet Separation from Produced Water Using Magnetic Nanoparticles", **SPE Paper 170828**, presented at SPE Annual Tech. Conf., Amsterdam, The Netherlands, Oct. 27-29, 2014.
10. Mehta, P., Huh, C., and Bryant, S. L., "Performance of Superparamagnetic Nanoparticles for Flow Assurance in Subsea Pipelines", **IPTC Paper 18090**, presented at Intern. Petrol. Tech. Conf., Kuala Lumpur, Malaysia, Dec. 12-14, 2014.
11. Wang, Q., Prigiobbe, V., Huh, C., Bryant, S. L., Bennetzen, M. V., and Mogensen, K., "Removal of Divalent Cations from Brine Using Selective Adsorption onto Magnetic Nanoparticles", **IPTC Paper 17901**, presented at Intern. Petrol. Tech. Conf., Kuala Lumpur, Malaysia, Dec. 12-14, 2014.
12. Zhang, T., Murphy, M., Yu, H., Bagaria, H. G., Yoon, K. Y., Neilson, B. M., Bielawski, C. W., Johnston, K. P., Huh, C., and Bryant, S. L., "Investigation of Nanoparticle Adsorption during Transport in Porous Media", **Soc. Petrol. Eng. J.**, in print (2014).
13. Rahmani, A. R., Bryant, S. L., Huh, C., Athey, A., Ahmadian, M., Chen, J., and Wilt, M., "Crosswell Magnetic Sensing of Superparamagnetic Nanoparticles for Subsurface Applications", **Soc. Petrol. Eng. J.**, in print (2014).
14. Yu, H., Yoon, K. Y., Neilson, B. M., Bagaria, H. G., Worthen, A. J., Lee, J. H., Cheng, V., Bielawski, C. W., Johnston, K. P., Bryant, S. L., and Huh, C., "Transport and Retention of Aqueous Dispersion of Superparamagnetic Nanoparticles in Sandstone", **J. Petrol. Sci. Eng.**, **116**, 115-123 (2014).
15. Soars, F. S. A., Prodanovic, M., and Huh, C., "Excitable Nanoparticles for Trapped Oil Mobilization", **SPE Paper 169122**, presented at SPE Symp. Improved Oil Recovery, Tulsa, OK., Apr. 12-16, 2014.
16. Worthen, A. J., Bagaria, H. G., Chen, Y., Bryant, S. L., Huh, C., and Johnston, K. P., "Nanoparticle-Stabilized Carbon Dioxide-in-Water Foams with Fine Texture", **J. Colloid Interface Sci.**, **391**, 142-151 (2013).

17. Bagaria, H. G., Yoon, K. Y., Neilson, B. M., Cheng, V., Lee, J. H., Worthen, A. J., Xue, Z., Huh, C., Bryant, S. L., Bielawski, C. W., and Johnston, K. P., "Stabilization of Iron Oxide Nanoparticles in High Sodium and Calcium Brine at High Temperatures with Adsorbed Sulfonated Copolymers", **Langmuir**, **29**, 3195-3206 (2013).
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19. Worthen, A. J., Bryant, S. L., Huh, C., and Johnston, K. P., "CO<sub>2</sub>-in-Water Foams Stabilized with Nanoparticles and Surfactant Acting in Synergy", **Amer. Inst. Chem. Eng. J.**, **59**(9), 3490-3501 (2013).
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22. Ryoo, S., Rahmani, A. R., Yoon, K. Y., Prodanovic, M., Kotsmar, C., Milner, T. E., Johnston, K. P., Bryant, S. L., and Huh, C., "Theoretical and Experimental Investigation of the Motion of Multiphase Fluids Containing Paramagnetic Nanoparticles in Porous Media", **J. Petrol. Sci. Eng.**, **81**, 129-144 (2012).
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38. Ingram, D. R., Kotsmar, C., Yoon, K. Y., Shao, S., Huh, C., Bryant, S. L., Milner, T. E., and Johnston, K. P., “*Superparamagnetic Nanoclusters Coated with Oleic Acid Bilayers for Stabilization of Emulsions of Water and Oil at Low Concentration*”, **J. Colloid Interface Sci.**, **351**, 225-232 (2010).
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## Patent applications

1. Huh, C., Ko, S., and Wang, Q., “*Methods of Removing Contaminants from Aqueous Mixtures*” (assigned to Univ. Texas at Austin), U.S. Provisional Patent Appl. **62,150,604**, April 21, 2015.
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4. Huh, C., Milner, T. E., Nizamidin, N., Wang, B., and Pope, G. A., “*Hydrophobic Paramagnetic Nanoparticles as Intelligent Crude Oil Tracers*” (assigned to Univ. Texas at Austin), U.S. Patent Appl. **PCT/US2014/011654**, Jan. 15, 2014.

5. Huh, C., Panthi, K. K., Mohanty, K. K., and Bryant, S. L., “*Methods and Compositions for Conformance Control Using Temperature-Triggered Polymer Gel with Magnetic Particles*” (assigned to Univ. Texas at Austin), U.S. Patent Appl. **PCT/US2014/069295**, Dec. 9, 2014.
6. Huh, C., Bryant, S. L., Milner, T. E., Johnston, K. P., Yoon, K. Y., and Bielawski, C., “*Determination of Oil Saturation in Reservoir Rock Using Paramagnetic Nanoparticles and Magnetic Field*” (assigned to Univ. Texas at Austin), International Patent Appl. **WO 2011/063023**, May 26, 2011.