

UNCONVENTIONAL RESERVOIR ENGINEERING PROJECT Colorado School of Mines



Nanofluidic Experiments and Phase Behavior – Progress and Directions

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UNCONVENTIONAL RESERVOIR ENGINEERING PROJECT Project Meeting, May 2, 2014, Golden, Colorado

Outline of Presentation

Nanoscale experiments – objectives

Progresses

- Experiments
- Phase behavior modeling

Plan forward

- Condensation in porous media
- Flash calculation procedure with pore size distribution
- Osmotic pressure and filtration



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Objectives of Nanofluidic Studies

Objectives

- Make (direct) observations and measurements
- Provide experimental data needed for the development of phase behavior and transport models

Approach

- Fabricate nanopores of a controlled size and surface properties
- Measure hydrocarbon gas condensation and build flash calculation models

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Measure single- and multiphase mobility and develop transport models

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Plan Forward (UREP 2nd Phase)

Topics	Tasks & Deliverables
Phase Behavior Experiments	 Measure condensation of pure hydrocarbon gas in nanopores Measure condensation of hydrocarbon mixtures Comparison with flash calculation model
Phase Behavior Modeling	 Model pore connectivity Model condensates & other compositions Research a flash calculation procedure with capillary pressure and pore size distribution
Osmotic pressure and filtration	 Create a simple setup to measure compositional variation across a nano-membrane Investigate phase equilibrium across the membrane Compare with model to establish membrane efficiency
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Students		
Gradu F Curre L	uated Feng Xiao (PhD): Lattice Boltzmann flow simulation ent Lei Wang (PhD): Lattice Boltzmann flow simulation and phase behavior modeling Elham Parsa (PhD): Phase behavior experiments in nanofluidics fuefeng Gao (MS): Multiphase flow experiments in nanofluidics fuence Huang (MS): Multiphase flow simulation	
Supp	ort	
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