Crisman-Nano

14 proposals received from 21 researchers
Participating Researchers

Petroleum Engineering Faculty:
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- Maria Barrufet
- Tom Blasingame
- John Killough
- George Moridis
- Hadi Nasrabadi
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Collaborators:
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- Arash Noshadravan, TAMU-CVEN
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Topics in Crisman-Nano

Five major areas identified:

• Shale Petrophysics
• Upscaling for Geomechanics
• Water-clay Interactions under Stress
• Nanopore Confinement Effect
• IOR/EOR Fluids
Tasks

Shale Petrophysics
- Permeability estimation using mercury injection (MICP) data
- Investigation of thermo-viscoelastic properties using nano-indentation
- 3-D kerogen pore-network modeling and molecular transport simulation

Upscaling for geomechanics
- Microscopic level poro-mechanical characterization and upscaling of source rocks in a statistical framework

Water-Clay interactions under compressional and shear stresses
- Delineating physical, chemical, and mechanical effects at a microscopic scale for controlled rock failure
Tasks (cont.)

Nanopore confinement effect
- Experimental demonstration of the effect using microfluidics and calorimetry
- Prediction of the effect on saturation pressure and two-phase properties
- Comparison of the effect on fluid phase behavior with the bulk fluid behavior
- Shale resource assessment in presence of the effect

IOR/EOR Fluids
- Prediction of miscible solvent-oil interactions for Eagle Ford shale oil
- Measurement of shale wettability modification using chemicals
- Statistical experimental design and optimization of EOR fluid injection
- Low-salinity water injection experiments for Eagle Ford Shale oil
- Vapor surfactant-\(\text{CO}_2\) injection and WAG experiments for Eagle Ford shale oil
Deliverables

Shale Petrophysics

• Unconventional reservoir rock permeability data
• Macroscopic thermo-viscoelastic properties of organic rich shale
• Nanoscale kerogen characterization and kerogen permeability

Upscaling for geomechanics

• Upscale local uncertainty of macroscopic poro-mechanical properties in a statistical framework

Water-Clay interactions under compressional and shear stresses

• Predict and control rock failure at the microscopic scale
Deliverables (cont.)

Nanopore confinement effect
- Hydrocarbons phase separation across nanopore size distribution of Eagle Ford shale
- Segregation of producible and trapped fluids in nanopores of Eagle Ford shale
- Pore-size dependent capillary pressure data
- Experimental data showing confinement effect
- Confined PVT properties of a fluid

IOR/EOR Fluids
- Solvent minimum miscibility pressure for Eagle Ford shale oil
- Design of chemical additives to change wettability
- Optimum EOR injectant formulation for Eagle Ford operations
- New insights into low-salinity waterflooding and WAG operations for Eagle Ford shale oil recovery
Discussions...