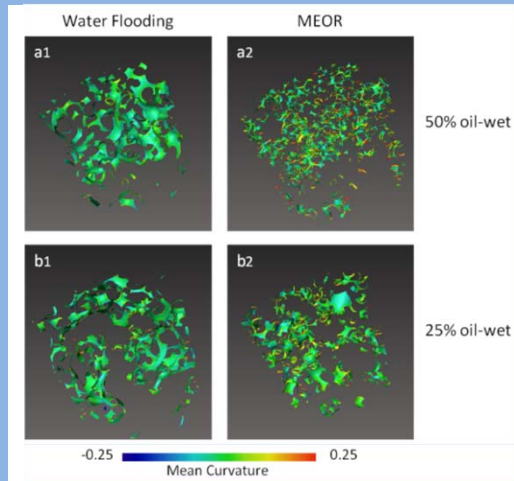


Microbial Enhanced Oil Recovery: A Pore-Scale Investigation of Interfacial and Microbial Interactions

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The work under this award uses fundamental research approaches to evaluate MEOR technology, specifically biofilm- and biosurfactant- facilitated oil recovery in fractional-wet systems and different pore morphologies. Results have been obtained in 4 different areas, see below.

1. Fractional-Wet Systems



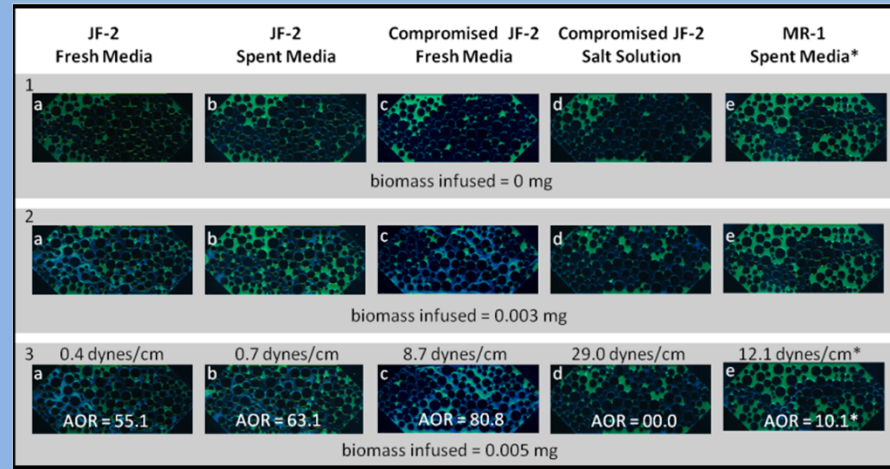
Example isosurfaces of the oil/water interface *after water flooding* (a1, and b1) and *after MEOR* (a2 and b2) for the 50% oil-wet and 25% oil-wet columns. Negative mean curvature values correspond to convex interfaces (i.e. water-wet curvature) and positive mean curvature values correspond to concave interfaces (i.e. oil-wet curvature)

Morphology	AOR (%)
Crushed	4.0
Crushed L & S	7.8
Poor Mix	71.3
Standard Mix	58.6

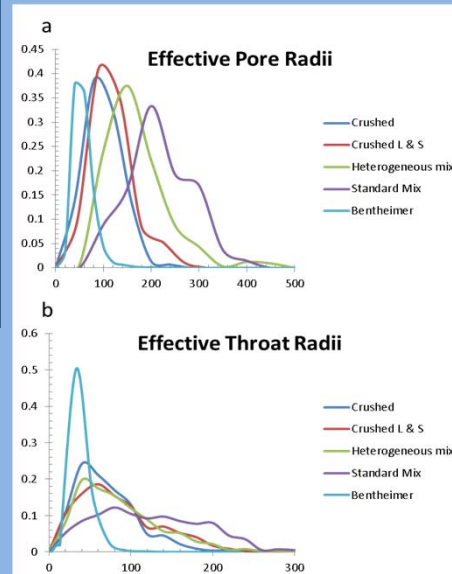
AOR results for biosurfactant treatment.

2. MEOR Mechanisms

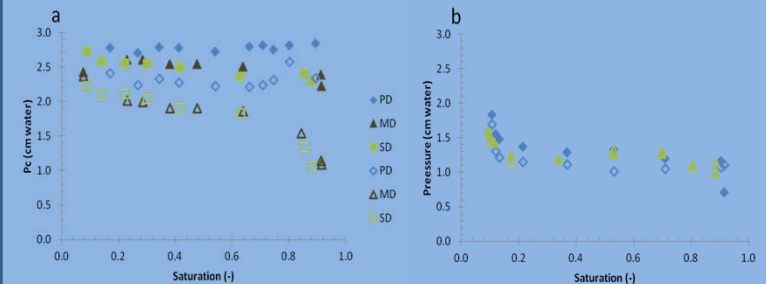
Selected stereo microscope images for each flooding solution tested, results are reported as AOR per biomass infused into the micromodel (green = oil, white = biomass). Each column corresponds to a given flooding solution and each row corresponds to equivalent biomass infused. IFT is Interfacial tension.



3. Pore Morphology



4. Interfacial Curvature



Agreement between curvature-based P_c (open symbols) and transducer-measured P_c (closed symbols): (a) drainage and (b) imbibition.

Pore morphologies analyzed with 3DMA-ROCK. Preliminary MEOR results for these morphologies are presented on the left.