

Abstract Submitted  
for the DFD15 Meeting of  
The American Physical Society

**Targeted delivery by smart capsules for controlling two-phase flow in porous media**<sup>1</sup> JING FAN, Harvard University, ALIREZA ABBASPOUR-RAD, Cornell University, DAVID WEITZ, Harvard University , HARVARD WEITZGROUP TEAM — Two-phase flow in porous media is significantly influenced by the physical properties of the fluids and the geometry of the medium. We develop a variety of smart microcapsules that can deliver and release specific substances to the target location in the porous medium, and therefore change the fluid property or medium geometry at certain locations. In this talk, I will present two types of smart capsules for targeted surfactant delivery to the vicinity of oil-water interface and targeted microgel delivery for improving the homogeneity of the porous medium, respectively. We further prove the concept by monitoring the capsule location and the fluid structure in the porous media by micro-CT and confocal microscopy. This technique not only is of particular importance to the relevant industry applications especially in the oil industry but also opens a new window to study the mechanism of two-phase flow in porous media.

<sup>1</sup>Advanced Energy Consortium BEG08-027

Jing Fan  
School of Engineering and Applied Sciences, Harvard University

Date submitted: 01 Aug 2015

Electronic form version 1.4