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Prem Bikkina

Oklahoma State University, USA

The state-of-the-art-of-surface modification techniques for geo-material microfluidics

In recent years, microfluidics has been gaining acceptance for the fundamental and applied petroleum engineering research. The major advantages of using microfluidics include flexibility in porous media and other related chip designs in a highly controlled and reproducible manner, easy and accurate control of fluid flow, and most importantly the ability to visually study the involved fluid distribution and displacement mechanisms both at pore and chip scales. The recent advancements in manufacturing techniques made it possible to prepare microfluidic chips that could replicate various pore-scale features of real porous media, and other patterns that are of relevance to petroleum engineering applications. However, a major limitation for the application of microfluidics for subsurface multiphase fluid flow and reactive transport is the dissimilarity in the physicochemical aspects of the real porous media and microfluidic solid surfaces. This presentation discusses the state-of-the-art of the surface modification techniques currently being used in geo-material microfluidics.

Biography

Prem Bikkina is an Assistant Professor in the School of Chemical Engineering, OSU, Stillwater. He has BS and MS degrees in chemical engineering and PhD degree in petroleum engineering. He worked as a postdoctoral fellow at Lawrence Berkeley National Laboratory. He also worked in various chemical and petroleum industries. His research work on enhanced hydrocarbon recovery, geological sequestration, and multiphase separation resulted into high impact journal publications and patents. He has been a peer reviewer for more than 16 international journals, ACS PRF and DOE proposals. He received the outstanding Reviewer Award from the Journal of Environmental Chemical Engineering in 2016. He received '2016 SPE Mid-Continent Regional Service Award' and '2017 SPE Distinguished Petroleum Engineering Faculty Award'. He is a professional member of SPE, AIChE, ACS, and ASME.

prem.bikkina@okstate.edu