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Application of micro- and nano-fluidics in petroleum industry

In recent years, micro- and nano-fluidics has been gaining acceptance for the fundamental and applied petroleum engineering research. Microfluidics has been used for PVT analysis, emulsion characterization, and enhanced oil recovery studies. Recent advancements in microfluidics manufacturing 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. The major advantages of using microfluidics studies are flexibility in porous media

and other related chip design in a highly controlled and reproducible manner, easy and accurate control of fluid flow, and most importantly the ability to visually study the involved oil recovery mechanisms both at pore and chip scales. Very recently, nanofluidics is being considered to understand the flow and phase behavior of fluids in unconventional reservoirs where the pore size distributions are in the nanoscale range. This presentation discusses the state-of-the-art of micro- and nano-fluidics in petroleum industry.

Biography

Prem Bikkina is an Assistant Professor in the School of Chemical Engineering, OSU, Stillwater. He has B.S. and M.S. degrees in chemical engineering and Ph.D. 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 15 international journals, ACS PRF and DOE proposals. Dr. Bikkina received '2016 Outstanding Reviewer Award' from the Journal of Environmental Chemical Engineering. 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.

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