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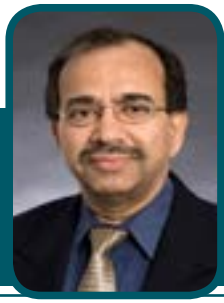

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## Interfacial interactions in petroleum reservoirs

The petroleum reservoirs constitute one of the most complex systems in nature that involve multiple interfaces coexisting and interacting with one another at elevated pressures and temperatures. Each of the four phases in the reservoir (solid rock, crude oil, associated gas and the brine) comprise multiple components, adding to the complexity of interfacial interactions. Furthermore, in order to recover the hydrocarbon resource, we impose processes involving the injection of water, chemicals and gases on these reservoirs, wherein the role of the interfacial interactions on multiphase flow through porous reservoir rocks becomes important. The tension at the various interfaces separating these phases of matter is a unique property in that it can reveal to us a great deal of information about the phases in contact including the direction and extent of mass transfer of components, their proximity to equilibrium, the nature of fluids distribution relative to one another, the contact angle and the spreading and adhesion behavior of liquids on solid surfaces. In this presentation we will examine, with supporting experimental data and literature findings, the multitude of roles played by interfacial tension in establishing (1) the phase behavior characteristics of solubility, miscibility, and the associated mass transfer mechanisms in multicomponent fluid systems, (2) the nature of fluids distribution in gas-oil-water in porous reservoir rocks at elevated pressures and temperatures, and (3) the spreading and adhesion characteristics in rock-oil-water-gas systems through dynamic contact angle measurements.

### Biography

Dandina N. Rao is the Emmett Wells Distinguished Professor in Petroleum Engineering Department at LSU; is a registered PE and has been involved in EOR research for over 3 decades. He has served as a member of the Editorial Review Board of the Journal of Canadian Petroleum Technology for more than 7 years and as technical editor of SPE journal for 5 years.

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