Modeling and Characterization of Reservoir Fluids Based on the PC-SAFT EoS and the Friction Theory

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Viscosity and density are key properties needed for the evaluation, simulation, and development of petroleum reservoirs. In previous works, the friction theory models have already been shown to be capable of delivering simple but accurate viscosity modeling results based on the popular cubic equations of state (EoS). However, recently, the friction theory approach has been extended to the more physically sound PC-SAFT EoS, which consistently delivers a good performance. As such, the integration of the friction theory with a more physically robust EoS opens up the possibility of even more reliable modeling of reservoir fluids. Consequently, in this work, a mass distribution based compositional characterization procedure of reservoir fluids, to be used in conjunction with the PC-SAFT EoS, is presented. This allows for the extension of the PC-SAFT EoS to the full viscosity, pvT, and phase description of reservoir fluids, form natural gases to heavy oils (with viscosities up to thousands of mPa·s).