Viscosity Modeling of Crude Oils Using the Eyring Theory

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A previously developed viscosity model of the Eyring type [1] was modified for the accurate correlation and/or prediction of viscosity of reservoir fluids varying from low to moderate molar masses. For model consistency, the modified approach uses the Eyring's absolute reaction theory rather than the corresponding-state-principle model of Aasberg-Petersen et al. [2] previously used in [1] to adequately represent the viscosity of each oil constituent over a wide pressure range: from dead to live oil conditions. In this work, the viscosity modeling performance of the present approach (Eyring's theory for liquid mixtures coupled with Eyring's theory for pure species) was assessed during the representation of experimental data of various light-to-moderate reservoir fluids exhibiting viscosity values ranging from 0.4 up to about 14 mPa·s.

[1] Macías-Salinas et al., "Eyring-Theory-Based Model to Estimate Crude Oil Viscosity at Reservoir Conditions", accepted for publication to the Energy & Fuels (2008).
[2] Aasberg-Petersen et al., Fluid Phase Equilibria, 70, 293, (1991).