

Compositional Model for Predicting Asphaltenes Precipitation

M.R. Omidkhah^S, M. Nikookar^C, G.R. Pazuki

Department of Engineering, Faculty of Chemical Engineering, Tarbiat Modarres University (TMU), Tehran, Iran

mohamad_ni@yahoo.com

M.A. Emadi

National Iranian Oil Company, Research & Development Directorate, Iran

Asphaltene Precipitation is a perennial problem in production of crude oils. Field condition conducive to precipitation includes normal pressure depletion, acid stimulation, gas-lift operation, and miscible flooding, just to mention a few. To avoid precipitation, it is useful to know the solubility of asphaltene in petroleum liquids as a function of temperature, pressure, and liquid-phase composition. Asphaltene precipitation has been the subject of numerous theoretical investigations. Most models in the literature are based on the classical Flory-Huggins polymer-solution theory coupled with Hildebrand regular-solution theory to describe the phase behavior of asphaltene-containing fluids. While these models can partially explain a few of the experimental results and have some use in describing selected asphaltene-precipitation phenomena in petroleum fluids, these solubility models are inadequate for explaining other experimental results. In this study, phase behavior of asphaltene precipitation is being investigated by a modified local composition model (Wilson model) and the estimated amount of asphaltene precipitation by this model is compared to Flory-Huggins model and experimental parameters. This comparison displays that the predicted amount of precipitation by above mentioned model into heavy oil is more accurate than the modified Flory-Huggins model.