Rheological Behavior from Light to Heavy Oils

Patsy Veronica Ramírez González [C, S], Otto Hahn Herrera, Dora Iliana Medina Medina and Sergio E. Quiñones Cisneros

Instituto de Investigaciones en Materiales, UNAM, Ciudad Universitaria, Mexico City, México

patsy@iim.unam.mx

Rheological behavior of heavy and light death oils have been studied. The oils belong to wells located in different regions of Mexico. The rheological measurements were carried out in a Stabinger viscometer and in a shear controlled rheometer with bob and cup and parallel plates geometry. The viscosity and rheological behavior exhibit a strong relation with temperature. For heavy oils, shear thinning was observed. The zero shear viscosity correlates with API gravity for the case of light oils. However, for heavy oils the viscosity definitively does not correlate the API gravity. For example, the viscosity of two fluids with API gravity around 12 varies in two orders of magnitude. An explanation of this finding may be due to the change in composition of the oil. Compositional structural analyses have been made for all oils in order to establish a correlation with viscosity. The transition between Newtonian and non-Newtonian behavior in terms of temperature has been studied, and it was found that non-Newtonian behavior does not directly relate to WAT.