P-18-800

THE INFLUENCE OF AN ULTRASONIC VIBRATION AND PULSATING AND OSCILLANTING FLOW OF A WORM-LIKE MICELLAR SOLUTION

E. E. Herrera-Valencia[1]*, F. Calderas[1], G. Sanchez-Olivares[2], A. Sánchez-Solís[3], O. Manero[3]

[1]Department of Chemical Engineerin,' Faculty of Chemsitry ,National University of Mexico, Distrito Federal, Mexico, [2]CIATEC, S.A, [3]Research Materials Institute, UNAM, Distrito Federal, Mexico.

**Corresponding author: emilio_ed @ hotmail.com*

Abstract In this work, the rectilinear Poiseuille flow of a complex liquid flowing in a vibration pipe coupled with a pulsating-time pressure gradient is analyzed. The pipe wall performs ultrasonic vibration (longitudinal and tranversal) and pulsating flow can be adequately represented by a time Fourier series. In order to find an analytical expression for the flow enhancement a quasi-static perturbation solution in terms of a small parameter is suggested. The stress tensor is separated in two contributions, the first due to the solvent and the second to the polymer contribution. The solvent is charaterized by a Newtonian liquid and the complex liquid with the Bautista-Manero-Puig model (BMP) constitutive equation, consisting in the Upper Convected Maxwell equation coupled to a kinetic equation to account for the breakdown and reformation of the fluid structure. Several particular cases are analyzed and the results are consistent with other simple models that have been analyzed in the literature [1-3]. The viscoelastic, kinetic and structural mechanism were characterized by the association of non-dimensional numbers to each mechanism. Finally, flow enhancement is predicted using experimental data reported elsewhere for a worm-like micellar solutions of CETAT