

Abstract :

This paper reports the effect of two polymers on the rheological behavior of Algerian bentonite. This latter was sourced from Mostaganem-M'zila and was used as drilling fluid in Algerian oil and gas wells. The two evaluated polymers were hydroxyethyl cellulose with a molecular weight of 9.5×10^5 g/mol and polyethylene glycol with molecular weight of 6×10^3 g/mol and 1×10^4 g/mol. Steady-state and dynamic shear rheology measurements were performed on a controlled stress rotational rheometer at a controlled temperature of $25 \pm 0.1^\circ\text{C}$. It was found that all mixtures 'water-bentonite-HEC' and 'water-bentonite-PEG' exhibit shear-thinning behavior and the flow curves could be described by the Herschel-Bulkley (H-B) model. The obtained results show that (HEC) increased the rheological properties of bentonite dispersion such as yield stress and consistency index and deleted the gel time of this dispersion contrary to (PEG), which decreased these rheological properties and increased the gel time. It was also noticed that the rheological behavior of bentonite dispersion enhanced with increasing (PEG) molecular weight.