

Studies on the rheological properties of aluminium oxihydroxide (boehmite) colloidal suspension

ABSTRACT

This paper presents both experimental and theoretical aspects of the rheological properties and gelling behavior of boehmite suspensions over a range of pH, temperature and concentration. Boehmite sológel behaved as a non-Newtonian shear thinning fluid with the increase in consistency index k at lower pH. The flow behavior index (n) representing the relative degree of shear thinning was influenced by pH. The power law theory was used to explain the k and n for gelling behavior and the limit of pseudoplasticity of the boehmite suspensions. It was also found that the variation of activation energy with pH had an appreciable effect on the viscosity of the suspensions. Further it was observed that the density of the suspensions was strongly pH-dependent, with a maximum density at pH 1. Hence, it can be concluded that the rheological properties of colloidal aluminium oxihydroxide (boehmite) suspensions are predominantly affected by the physico-chemical parameters.

Keyword: Boehmite; Rheology; Sológel; Non-Newtonian; Flow behavior index