

Rheology and gelling behavior of boehmite sols

Abstract

Rheological studies of boehmite sols based on pH was (1) to study the nature of flow properties of the boehmite sols and (2) to identify the sol-gel transition of boehmite sols with the change of pH of the liquid. It is evident that the shear rate and viscosity of the liquid exhibit a pseudoplastic (shear thinning) flow behavior for all pH level. The transformation of sol-gel at low pH probably due to the hydrogen bond between the layers of the boehmite structure. The temperature has an appreciable effect on the activation energy during the sol-gel transition. The flow activation energies δE_n are in the range of 1.75 to 6.25 J mol⁻¹ at temperature 298-384 K. Based on these results, the flow activation energy of boehmite sols sharply decreases with decreasing the pH. The flocculation of the suspension at pH 4 to 1 showed to be favorable in term of enhanced density of boehmite.