

SURFACE CHARGE DENSITY FOR KAOLINITE IN AQUEOUS SUSPENSION

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Abstract

In the field of environmental science, the surface charge density (σ_0) determines how easily a solid substrate is able to adsorb potential ions from their solutions; also, this property has applications in colloids science, e.g., flotation of minerals. The point of zero charge (pH_{PZC}) for a given mineral surface is the pH value at which its surface has a net neutral charge. The significance of the pH_{PZC} value is that a given mineral surface will have a positive charge in the acid domain (less than the point of zero charge) and a negative charge in the alkaline domain of pH scale (more than the point of zero charge).

The aim of the paper is to evaluate the surface charge density of kaolinite (Aghireș, Romania) suspended in NaNO_3 electrolyte, using acid-base titration method. It was observed that the value of the point of zero charge for this mineral is $\text{pH} = 4.2$. Results obtained for three different electrolyte solutions show that the pH_{PZC} value for the mineral is in a good correlation with the data from the literature. Below this value the surface charge density (σ_0) increases with the electrolyte concentration, while above this value, σ_0 decreases with the increase of the electrolyte concentration.

Key words: kaolinite, surface charge density, point of zero charge, acid-base titration method

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