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Małgorzata Wiśniewska, Stanisław Chibowski, Teresa Urban

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Nanozirconia surface modification by anionic polyacrylamide in relation to the solid suspension stability – effect of anionic surfactant addition

Małgorzata Wiśniewska*, Stanisław Chibowski, Teresa Urban

*Department of Radiochemistry and Colloids Chemistry, Faculty of Chemistry, Maria Curie - Skłodowska University, Maria Curie - Skłodowska Sq. 3, 20-031 Lublin, Poland, *wisniewska@hektor.umcs.lublin.pl; tel.: (48)(81)5375622, fax: (48)(81)5332811*

Abstract

The turbidimetry and static light scattering methods were applied to specify the stability conditions of aqueous nanozirconia suspension. The stability coefficients and mean sizes of formed aggregates (flocks) were determined. The effects of solution pH (in the range 3-10), presence of anionic polyacrylamide (PAM), carboxyl groups content in its macromolecules (5-50%), as well as anionic surfactant (sodium dodecyl sulfate - SDS) addition were examined. The obtained changes in the system stability after the polymer (and surfactant) addition were explained based on adsorption (PAM adsorbed amount) and electrokinetic data (zeta potential). Analysis of the obtained results indicated that the simultaneous presence of the polymer and surfactant at pH 6 has the greatest influence on the nanozirconia suspension stability. Under such conditions considerable improvement of the system stability takes place due to the electrosteric interactions between solid nanoparticles.

Keywords: anionic PAM adsorption, nanozirconia, SDS influence, zeta potential, aggregate/flocks size, surface charge neutralization.

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