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Ion trapping on silica nanoparticles: Effect on the ζ-potential

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We propose a model to interpret the concentration dependence of the ζ-potential of a suspension of silica nanoparticles of spherical shape in an electrolytic solution. The model is based on the numerical solution of Poisson-Boltzmann equation, in spherical geometry, taking into account the ionic adsorption from the nanoparticles. The kinetic equation used for the description is a generalization of the Langmuir's isotherm, modified to take into account the saturation of the adsorption phenomenon. A good agreement between the theoretical model and the experimental data is found. The model allows the determination of adsorption/desorption parameters of the nanoparticles.

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