Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Ion size effects on the electrokinetics of spherical particles in salt-free concentrated suspensions[1] RAFAEL ROA, FELIX CARRIQUE, Fisica Aplicada I, Universidad de Malaga, EMILIO RUIZ-REINA, Fisica Aplicada II, Universidad de Malaga — In this work we study the influence of the counterion size on the electrophoretic mobility and on the dynamic mobility of a suspended spherical particle in a salt-free concentrated colloidal suspension. Salt-free suspensions contain charged particles and the added counterions that counterbalance their surface charge. A spherical cell model approach is used to take into account particle-particle electro-hydrodynamic interactions in concentrated suspensions. The finite size of the counterions is considered including an entropic contribution, related with the excluded volume of the ions, in the free energy of the suspension, giving rise to a modified counterion concentration profile. We are interested in studying the linear response of the system to an electric field, thus we solve the different electrokinetic equations by using a linear perturbation scheme. We find that the ionic size effect is quite important for moderate to high particles charges at a given particle volume fraction. In addition for such particle surface charges, both the electrophoretic mobility and the dynamic mobility suffer more important changes the larger the particle volume fraction for each ion size. The latter effects are more relevant the larger the ionic size.

[1]Work supported by Junta de Andalucia, Spain (Project P08-FQM-3779) and MICINN, Spain (Project FIS2010-18972), co-financed with FEDER funds by the EU.

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Date submitted: 26 Oct 2011 Electronic form version 1.4