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Colloidal stability in concentrated electrolyte solutions using large counterions GUILLERMO GUERRERO GARCIA, Department of Materials Science, Northwestern University, Evanston, IL 60208, USA, PEDRO GONZALEZ MOZUELOS, Departamento de Fisica, Cinvestav del I. P. N., Av. Instituto Politecnico Nacional 2508, Distrito Federal, C. P. 07360, Mexico, MONICA OLVERA DE LA CRUZ, Department of Materials Science, Northwestern University, Evanston, IL 60208, USA — The stability of charged colloids in solution has been widely studied because it has ubiquitous applications in science and engineering. According to the classical DLVO theory, the electrostatic repulsion among charged colloids is significantly screened at high electrolyte concentrations. As a result, highly charged particles are expected to aggregate due to short-range van der Waals attractive interactions. Nevertheless, the classical DLVO theory relies in the linear Poisson-Boltzmann equation, which is usually restricted to low electrolyte concentrations and weakly charged colloids. In this work, we propose a novel mechanism beyond the classical DLVO picture that uses large counterions to prevent highly charged nanoparticles from aggregating in salt solutions with concentrations up to 1 M, in agreement with experimental observations.

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