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Session D07: Electrokinetics: General
2:30 PM–4:40 PM, Sunday, November 18, 2018
Georgia World Congress Center Room: B212

Chair: William Ristenpart, University of California, Davis

Abstract: D07.00009 : Streaming current for interfaces covered by clustered particle monolayers*

4:14 PM–4:27 PM

Abstract

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Measurements of streaming current (i.e., the current resulting from charge convection in the electric double layer) are widely used to investigate properties of micro- or nano-particle monolayers adsorbed on a planar surface. Our previous study showed that, at a given area fraction, the streaming current is practically the same for the equilibrium and random-sequential-adsorption particle distributions and is only slightly different for square and hexagonal periodic lattices. Numerical results presented here demonstrate that the microstructure dependence of the streaming current is very strong for clustered particle distributions, especially for closely packed compact clusters separated by large particle-free areas. This dependence results from enhanced charge convection in the particle-free regions and reduced charge convection within the clusters, where there is strong hydrodynamic screening. The limiting behavior for large compact clusters is described using interpolation formulas combining streaming current contributions from the clusters, particle-free areas, and border regions.

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