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Theory of Charge Regulation of Colloidal Particles in Electrolyte Solutions

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Abstract: We present a theory that enables us to calculate the effective surface charge of colloidal particles and to efficiently obtain titration curves for different salt concentrations. The theory accounts for the shift of pH of solution due to the presence of 1:1 electrolyte. It also accounts self-consistently for the electrostatic potential produced by the deprotonated surface groups. To examine the accuracy of the theory we have performed extensive reactive Monte Carlo simulations, which show excellent agreement between theory and simulations without any adjustable parameters

Key-words: Charge Regulation, Colloidal particles, Titration curve
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