

Probing Nanometer-Ranged Attraction between Similar and Dissimilar Surfaces in Presence of Polyamine Cations

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Abstract Colloidal probe force microscopy was employed to measure forces between positively charged amidine latex (AL) and negatively charged sulfate latex (SL) particles [1, 2]. Surface forces between all possible pairs, namely AL-AL, AL-SL and SL-SL, are measured in aqueous solutions of an aliphatic hexamines (N6) and KCl. The force profiles can be described by the classical theory of Derjaguin, Landau, Verwey, and Overbeek (DLVO) down to distances of about 7nm, provided that Poisson-Boltzmann equation is used [3]. However, at interparticle distances below few nanometers, additional attractive non-DLVO forces are observed in all the systems. These forces can be modelled with an exponential force profile. The range of these forces is shorter in the presence of monovalent ions and is about 0.3nm. But, in the presence of N6, the range of this attraction is about 1.0 nm in the SL-SL system, 0.6 nm in the AL-SL system, and 0.3 nm in the AL-AL system.

References

- [1] M. Moazzami-Gudarzi, G. Trefalt, I. Szilagyi, P. Maroni, M. Borkovec, *Phys. Chem. Chem. Phys.*, **18** (2016) 8739-8751.
- [2] M. Moazzami Gudarzi, G. Trefalt, I. Szilagyi, P. Maroni, M. Borkovec, *J. Phys. Chem. C*, **119** (2015) 15482-15490.
- [3] F. J. Montes Ruiz-Cabello, G. Trefalt, P. Maroni, M. Borkovec, *Langmuir*, **30** (2014) 4551-4555.

