

Adsorption and Aggregation of Cationic Amphiphilic Polyelectrolytes on Silica

Yulia Samoshina,[†] Tommy Nylander,^{*,†} Per Claesson,[‡] Karin Schillén,[†]
Ilias Iliopoulos,[§] and Björn Lindman[†]

*Physical Chemistry 1, Lund University, P. O. Box 124, SE-22100 Lund, Sweden,
Department of Chemistry, Surface Chemistry, Royal Institute of Technology, SE-10044,
Stockholm, Sweden, Institute for Surface Chemistry, P. O. Box 5607,
SE-11486 Stockholm, Sweden, and Matière Molle et Chimie, UMR-7167,
ESPCI-CNRS, 10 Rue Vauquelin, F-75231 Paris Cedex 05, France*

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The adsorption of two cationic amphiphilic polyelectrolytes, which are copolymers of two charged monomers, triethyl(vinylbenzyl)ammonium chloride and dimethyldodecyl(vinylbenzyl)ammonium chloride (which is the amphiphilic one) with different contents of amphiphilic groups (40% (40DT) and 80% (80DT)), onto the hydrophilic silica–aqueous solution interface has been studied by in situ null ellipsometry and tapping mode atomic force microscopy (AFM). Adsorption isotherms for both polyelectrolytes were obtained at 25 °C and at different ionic strengths, and the adsorption kinetics was also investigated. At low ionic strength, thin adsorbed layers were observed for both polyelectrolytes. The adsorption increases with polymer concentration and reaches, in most cases, a plateau at a concentration below 50 ppm. For the 80DT polymer, at higher ionic strength, an association into aggregates occurs at concentrations at and above 50 ppm. The aggregates were observed directly by AFM at the surface, and by dynamic light scattering in the solution. The adsorption data for this case demonstrated multilayer formation, which correlates well with the increase in viscosity with the ionic strength observed for 80DT.