Adsorption of Cationic Sterically-Stabilized Polystyrene Latex at the Air-Water Interface: Contact Angle Determination for Submicrometer-Sized Particles by Ellipsometry

Damien Dupin[1], Steven P. Armes[1], Erica J. Wanless[2],Timothy N. Hunter[3] and Graeme J. Jameson [2]

(1) Dept. of Chemistry, Dainton Building, University of Sheffield, Brook Hill, Sheffield, South Yorkshire, S3 7HF, UK, (2) *School of Environmental and Life Sciences, The University of Newcastle,Callaghan, New South Wales, 2308, Australia*, (3) *Institute of Particle Science & Engineering, School of Process, Environmental & Materials Engineering, University of Leeds, Leeds, Yorkshire, LS2 9JT, U.K*

Near-monodisperse, sterically-stabilized cationic polystyrene latexes of either 122 nm or 310 nm diameter were prepared by aqueous emulsion polymerization using cheap, commercially available reagents. At low pH, both these latexes stabilized foams generated by either hand-shaking or by using a foam column. SEM studies confirmed that the dried foam mainly comprised well-defined bilayers, which suggests that each air bubble is stabilized by a latex monolayer. Adsorption of the same latexes at the planar air-water interface was studied using the Langmuir-Blodgett trough technique. Surface pressure isotherms confirmed particle desorption from the interface on repeated compression of the latex monolayers. For the 122 nm latex at pH 2, ellipsometric analysis enabled a contact angle of approximately 43° to be calculated from a simple two-layer model. Similar results were obtained for the 310 nm latex, but the data were much less reliable in this case due to additional background particle scattering.