

## **Self Segregation of Water Borne Acrylic Latices**

**R.E. Trueman, A.F. Routh, M. Murray, S. Emmett**

*BP Institute, University of Cambridge, Madingley Road, Cambridge, UK, CB3 0EZ,*

The vertical distribution of particles within a dried film has a large impact on the final film properties. The mechanism by which the particles in a film come into close packing during solvent evaporation has an important role to play in the final film morphology. This paper demonstrates that by controlling the conditions during this drying stage a segregation of two different types of particle can occur, a process which is governed by the associated Peclet number. A theory for developing a novel method of segregation during drying of a two component latex film has been derived. The diffusion behaviour of the latex particles predicted by this theory has been modelled numerically as a coupled PDE system using a modified FTCS scheme. This system was also experimentally investigated using a purpose built environmental chamber which allows for controlled evaporation of water from drying latex films. Volume fractions of particles of each component were evaluated both on the surface and through the cross-section of the films, using Atomic Force Microscopy, Cryo Scanning Electron Microscopy and Nuclear Magnetic Resonance techniques.