Understanding the Mysteries of Latex Film Formation

J.L. Keddie
Department of Physics, School of Electronics and Physical Sciences
University of Surrey
Guildford, Surrey GU2 7XH

Latex film formation is a multi-stage process by which waterborne polymer colloids are transformed into a homogeneous layer. Observations of the process have discovered many intriguing mysteries. In this lecture, I will highlight how a combination of modelling and experimentation by groups worldwide over the past decade has gradually unravelled these mysteries. For instance, the mysteries of why drying only sometimes occurs from the edge of a latex film and why in some cases the vertical distribution of water is non-uniform are now understand. Questions about what determines why particles deform and coalesce under various drying conditions have likewise been explained, with intriguing interrelationships between the particle deformation mechanism and the water distribution. More recently, some mysteries of why surfactant and certain types of particles are sometimes found at a film interface – but other times not found there - have become better understood. Finally, in nanocomposite films created from latex, some new mysteries have emerged and are offering directions for future investigation.