



Emulsion Polymers Consulting
and Education, LLC presents

*Latex Film Formation**



Three-Day Interactive Workshop
September 22-24, 2014
Imparando UK LTD
London
United Kingdom

Faculty
Joseph L. Keddie, PhD
Donald C. Sundberg, PhD

* Emulsion Polymers Consulting and Education (EPCEd) has a curriculum of 10 interactive workshops under the umbrella of the Science and Technology of Emulsion Polymers, or STEPⁿ. This workshop is STEP¹⁰.

OBJECTIVES: Provide industrial scientists and engineers with an intensive, interactive workshop on the fundamental aspects of latex film formation. The removal of water from latex based coatings causes the particles to pack together, deform and coalesce in distinctive steps in order to form a cohesive film with good properties. Surfactants and other non-volatile materials added to the latex in manufacture remain in the film and influence its properties. Participants will have an opportunity to grasp the basic principles that govern the outcome of the filming process, and to become acquainted with experimental approaches and analytical techniques to study and characterize the intriguing transformation from liquid dispersion to cohesive film.

INTENDED AUDIENCE: This workshop is directed towards those in industry who produce or use water based latices for use as architectural and paper coatings, textiles and carpet backings, pressure sensitive adhesives, printing inks, etc. Those professionals involved with pigments, colorants and dispersants will also gain advantage by learning the details of the water-borne filming process.

STRUCTURE OF THE WORKSHOP: This 3-day workshop will be conducted in a *highly interactive manner* with participants being engaged in discussions, demonstrations, and problem solving.

REGISTRATION INFORMATION

The registration fee includes the full book of slides for the workshop, coffee breaks, and Tuesday evening dinner. It does not include lunches, accommodations or travel. Early registration is recommended due to the workshop size limitation of 24 participants.

Registration Fee: \$1800 USD
Registration Form – [Click here](#)

Contact for further information:
info@epced.com

Latex Film Formation Workshop

Day 1

AM: Introduction to the Workshop

1. Introduction to film formation
2. Creating latices with controlled properties
3. Colloidal Stability
4. Latex/coating rheology
5. Concepts of wetting and adhesion

PM: Latex film drying

1. Water evaporation
2. Vertical drying profiles
3. Techniques to study particle packing stage
4. Horizontal packing and drying fronts
5. Particle packing in “sparse binder” content coatings (as in paper coatings)
6. Latex and pigment particle packing - dynamic modeling

Day 2

AM: Deformation of binder particles

1. Geometric models of space filling rhombic dodecahedra
2. Driving forces for particle deformation
3. Resistances to particle deformation
4. Models for particle deformation
5. Effects of temperature on deformation
6. Effect of particle size and distribution
7. Determining deformation mechanisms for wet films
8. Other techniques to study particle deformation (AFM, TEM, etc.)
9. Introduction to film cracking

Day 2

PM: Polymer chain diffusion across particle interfaces

1. Thermodynamics of polymer-polymer interfaces
2. Development of mechanical strength and toughness
3. Polymer chain diffusivity
4. Importance of polymer T_g relative to drying temp.
5. Experimental techniques (FRET, TEM, SANS)
6. Influence of “hard particles” (e.g. pigments)
7. Influence of carboxylic acid comonomers
8. Influence of coalescing aids – issues of VOC
9. Crosslinking and diffusion

Day 3

AM: Surfactants and Composites

1. Surfactant distributions in wet latex films
2. Surfactant distributions in dry films – depth profiling
3. Effect of surfactants on film properties
4. Use of reactive surfactants
5. Composite latex films
6. Effects of pigments and fillers, CPVC
7. Water absorption into polymer films
8. Water whitening of polymer films

Day 3

PM: Future directions and challenges

1. Self-stratification during film formation
2. Film formation of anisotropic particles
3. IR processing of coatings
4. Textured coatings by IR assisted evaporative lithography
5. Marangoni effects
6. Open discussion and problem solving
7. Workshop evaluation by participants

Faculty Profiles

Joseph L. Keddie is a Professor of Soft Matter Physics at the University of Surrey, UK. His research concerns the physical properties of polymers at interfaces and in colloids, using several techniques of characterization, particularly scanning probe and electron microscopies, magnetic resonance profiling, and ellipsometry (both visible and infrared). His scientific contributions to polymer surfaces and colloids were recognised by the UK's Institute of Physics with an award of the 2001 Paterson Medal and Prize. His research group has won two Roon Awards from the Federation of Societies for Coatings Technology and the 2012 Innovation Prize at the Coatings Science International Meeting. After receiving a PhD in materials science from Cornell University in 1993, he first started studying latex film formation as a post-doctoral fellow at the University of Cambridge (UK), where he pioneered the use of environmental-SEM and ellipsometry for that application. A co-author of more than 100 journal articles, his *h*-index is 30, which means that 30 of his publications have been cited 30 times or more. In 2010, he and Dr. Alex Routh summarized the topic of film formation with a book entitled *Fundamentals of Latex Film Formation: Processes and Properties*.

Professor Donald C. Sundberg has been working in the field of emulsion polymers for 47 years. He received a bachelor's degree in chemical engineering from Worcester Polytechnic Institute (Massachusetts) and his Ph.D. from the University of Delaware. He spent 5 years working on impact modifiers for ABS resins with the Monsanto Company prior to pursuing a career in the university setting. He has extensive research experience in emulsion polymerization and is widely recognized for his work on structured latex particles. This has resulted in nearly 100 peer reviewed publications and he has presented many conference papers. In addition he has conducted many workshops, most notably the one on latex particle morphology control, now in its 10th annual offering. He spent a sabbatical year at the Institute for Surface Chemistry in Stockholm and was Chair of the Gordon Research Conference on Polymer Colloids. He maintains active research interests in polymerization kinetics in solution, bulk and emulsion systems, interfacial science and polymer morphology control, diffusion in polymers, microencapsulation, coatings, and controlled release technology. He is an Emeritus Professor of Materials Science at the University of New Hampshire and is the founder of Emulsion Polymers Consulting and Education, LLC.

Registration Form

Latex Film Formation

London, United Kingdom

September 22-24, 2014

Name _____

Address _____

City/State _____

Postal Code _____

Country _____

Position or Title _____

Organization _____

Phone _____

Fax _____

E-mail _____

Participant Category

- Standard price for industrial participant: \$1800 (USD)
- Discounted price for additional participant(s) from the same company: \$1700 (USD)
- Academic participant: \$1600 (USD)

There is a non-refundable fee of \$50 (USD). Cancellation of registration can be made up until August 22, 2014 with a full refund less the \$50 processing fee.

Method of Payment:

- Credit Card

___ Visa ___ MasterCard ___ American Express

Card # _____

Visa or MC Security Code # (last 3 digits on back of card) _____

AMEX Security Code # (4 digits on front of card) _____

Expiration date _____

Signature _____

Credit Card billing address (if different than above):

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- Wire transfer from bank --- Go to info@epced.com and request banking instructions.

For a secure eCommerce transaction, FAX this completed form to EPCEd at 1-603-343-4015, or call 1-603-742-3370.

This registration form may serve as an invoice for those who register.