MSE-Colloquium@NTU

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Rheological and Colloidal Aspects of Waterborne Paints

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Abstract

Waterborne latex paints are complex colloidal systems that present major challenges against establishing universal governing mechanisms of their stability and rheology. The complexities emanate from the wide variability of ingredients that make up the dispersed phase (latex, pigments, and fillers) as well as the continuous aqueous phase (thickeners, surfactants, dispersants, other additives, and electrolytes) of fully-formulated paints. A uniformly mixed latex paint that comes off of a mixing vessel, once poured into a container and stored, can undergo many changes such as flocculation, aggregation, sedimentation, and syneresis. Over the past four decades, a polymeric surfactant class of thickeners commonly known as associative thickeners have enhanced the formulating latitude towards circumventing some of these problems. However, the colloidal stability and rheological properties of coatings formulated with associative thickeners are quite sensitive to changes in formulation components; small changes in these variables (e.g., latex, thickener, and surfactant) can have profound effects. A thorough understanding of these thickeners' multi-component interactions and their sensitivities to variables in fully-formulated coatings is still lacking. In this presentation, the current level of knowledge on the subject matter will be overviewed, and what remains to be done in order to fill the existing knowledge gaps will be outlined.

An overview of the polymers and coatings program at Cal Poly will also be presented.

Biography

Professor Ray Fernando has been the occupant of the Arthur C. Edwards Endowed Chair in Coatings Technology at California Polytechnic State University since 2002. He is also the director of Cal Poly's Kenneth N Edwards Western Coatings Technology Center. Professor Ray received his Chemistry BSc degree in 1979 in Sri Lanka and his Polymers and Coatings PhD in 1986 from North Dakota State University. He has fifteen years of industrial experience in coatings as a Lead R&D Scientist at Air Products and Chemicals (3- years) and as Coatings Program Manager for Armstrong World Industries (12-years including other positions).

Professor Ray has numerous publications and patents under his name. As an expert in the field, his perspectives are frequently sought after in keynotes, seminars and workshops. Being an avid volunteer, Prof Ray has served and chaired in various technical committees of the American Coatings Association and the Federation of Societies for Coatings Technology (FSCT). Over the years, Prof Ray has received notable awards such as the FSCT's President's Award in 2005, Cal Poly Provost's Leadership Award for Partnership in Philanthropy in 2017, the American Coatings Association's Joseph J Mattiello Award in 2018 and the American Chemical Society's Roy W Tess Award in 2019.

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