

# Particle Ordering in Bimodal Blends of Colloidal Polymer Particles: Designing and Controlling Structure in Waterborne Coatings

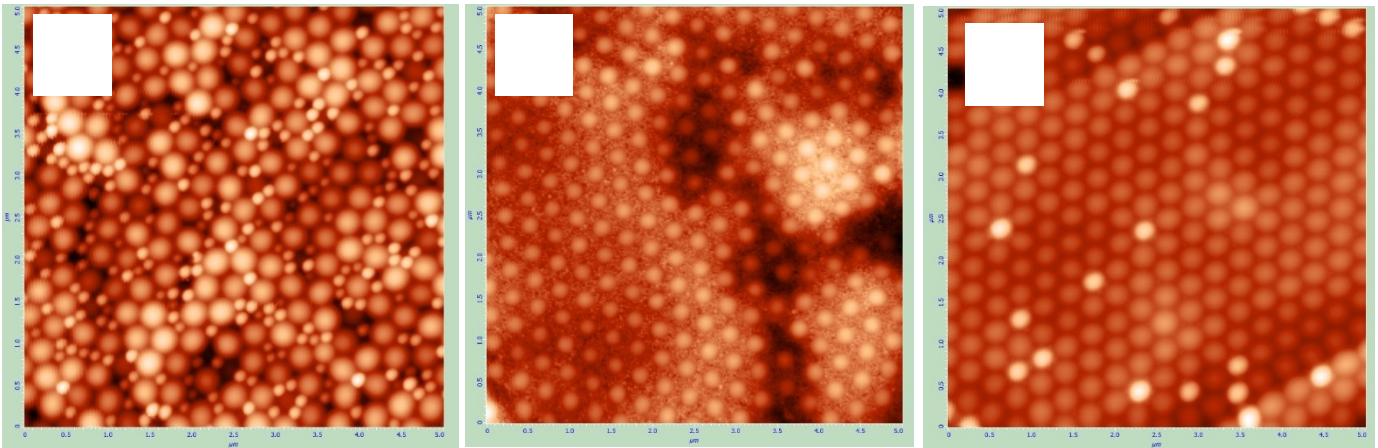
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Using blends of colloidal polymer particles is a useful strategy in the development of nanostructured coatings. For instance, crack-free and scratch-resistant coatings can be obtained from hard particles (with a glass transition temperature above the temperature of use) blended with soft particles. In this work, the effect of the size ratio of large and small particles in a bimodal blend on the particle packing and ordering has been explored. Specifically, large (350 nm diameter) *soft* particles were blended with either 350 nm, 175 nm or 50 nm *hard* particles at varying volume ratios. Images of the surfaces of the dried films (below) were obtained via AFM to characterise particle packing density and ordering. For the blends containing 175 nm hard particles, a clear trend from order to disorder can be seen as their volume fraction is increased. For blends containing 50 nm particles, on the other hand, ordering of the particles is largely unaffected up to 20 vol. % addition, above which some disordering can be observed. These results provide guidelines for the design of dense colloidal coatings.



Figures showing blends at 10% vol. hard particles containing A) 175 nm particles, B) 50 nm particles and C) 350 nm particles

Preferred Session:

Oral Presentation:

Poster: