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*Clustering in interfering models of binary mixtures.*

Colloids are binary mixtures of molecules with one type of molecule suspended in another. It is believed that at low density typical configurations will be well-mixed throughout, while at high density they will separate into clusters. We characterize the high and low density phases for a general family of discrete *interfering binary mixtures* by showing that they exhibit a “clustering property” at high density and not at low density. The clustering property states that there will be a region that has very high area, very small perimeter, and high density of one type of molecule. To demonstrate the existence of the clustering property at high density, for example, we use careful combinatorial arguments to show that the vast majority of configurations have the clustering property, so that with high probability, a random configuration will as well. (Received September 24, 2012)