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## Monte Carlo simulation of particle segregation in evaporating bi-dispersed colloidal droplets

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Colloidal droplets are used in a variety of practical applications. Some applications require particles of different sizes. These include medical diagnostic methods, the creation of photonic crystals, the formation of supraparticles, and the production of membranes for biotechnology. Series of experiments have previously shown the possibility of particle separation by their size near the contact line. A mathematical model has been developed to describe this process. Bi-dispersed colloidal droplets evaporating on a hydrophilic substrate are taken into consideration. A particle monolayer is formed due to the small value of the contact angle near the periphery of such droplets. The shape of the resulting sediment is associated with the coffee ring effect. The model takes into account the particle diffusion and transfer with a capillary flow caused by liquid evaporation. Monte Carlo simulation of particle dynamics has been performed at several values of the solution concentration. The numerical results agree with the experimental observations, in which small particles accumulate closer toward the contact line than large particles.

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