**Simultaneous Liquid Flow and Drying on Rotating Cylinders**

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The coating and drying of nonflat discrete objects is a key manufacturing step for a

wide variety of products. Flow of a thin nonvolatile liquid film on the outside of a rotating cylinder is commonly used as a model problem to study the coating of discrete objects. However, the behavior of a volatile particle-laden coating remains an important open problem. In this work we use lubrication theory to study the evolution of a liquid film laden with colloidal particles in the presence of solvent evaporation. Two coupled evolution equations describing variations in coating thickness and composition as a function of time and the angular coordinate are solved numerically. In the limit of a rapidly rotating cylinder, gravitational effects are negligible and linear stability analysis and nonlinear simulations demonstrate that nonuniform drying at higher drying rates may cause thickness and composition disturbances to regrow after initially decaying. When gravitational effects are significant, poor liquid redistribution at lower rotation rates and higher drying rates leads to less uniform coatings. Colloidal particles hinder liquid redistribution at high concentrations by increasing the viscosity, but help prevent rupture of the coating at more moderate concentrations. A parametric study reveals that both thickness and composition variations are minimized at high rotation rate, low drying rate, and moderate initial particle concentration.