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Using Self-Similarity to Simulate Meniscus Evolution Around TMV Due to Surface Diffusion[1] RICHARD POTTER, YUE ZHANG[2], ZAHRA FAKHRAAI[3], Univ of Pennsylvania — It has been hypothesized that enhanced surface diffusion allows the formation of stable molecular glasses during physical vapor deposition. The improved properties of these glasses, such as increased density and kinetic stability can help improve material properties in pioneering fields of technology such as organic electronics and pharmaceutical drug delivery. While surface diffusion has been measured previously on the surfaces of organic glasses, direct measurements on the surface of vapor-deposited stable glasses has proven more challenging. This research focuses on a straightforward method for measuring the surface diffusion coefficients of molecular glasses through the use of tobacco mosaic virus (TMV) nanorods as probe particles. In conjunction, mathematical models based on the thin film equation were used to simulate fast meniscus formation around the nanorods on the glassy surface. The evolution of the meniscus is self-similar, which allows quick quantification of the diffusion coefficient, by solving the time evolution for a single experiment. Experimental data were compared and fit to these simulations to derive a quantity for the surface diffusion coefficient, D_s.

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