42g On the Stability of Ordered Ultrathin Organic Films: Dewetting and Ostwald Ripening

Jaime Ruiz-Garcia, R. D. Cadena-Nava, J. L. Cuellar-Camacho, E. A. Vazquez-Martinez, and M. A. Valdez-Covarrubias

We report observations of dewetting by collapsed Langmuir films of fatty acid transferred onto mica. Observations by Brewster angle microscopy at the collapse pressure indicate the coexistence of the monolayer with crystallite multilayer structures. When the collapsed films are transferred onto mica and analyzed by atomic force microscopy heterogeneous dewetting is observed. However a new mode of dewetting is reported where the crystallites act as nucleation centers. In addition, formation of dewetting rings and fractal channels is observed where the material moves from the edge of the rings or channels towards the nucleation center, in contrast to typical heterogeneous dewetting. In the case of the rings, we measured the growth of the dewetting ring and it radius follows a power law with time, which is consistent with a 2D free diffusion mechanism for the mass transport. Ostwald ripening is also observed where the bigger crystallites continue to grow at the expense of the smaller ones. Differences between dewetting patterns are due to different molecular order of the transferred monolayers.