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Shear-induced morphology in mixed phospholipid films AMIR HIRSA, JAMES YOUNG, DAVID POSADA, Rensselaer Polytechnic Institute, JUAN LOPEZ, Arizona State University — Flow of mixed phospholipid films on liquid surfaces plays a significant role in biological processes ranging from lipid bilayer fluidity and the associated behavior of cellular membranes, to flow on the liquid lining in the lungs. Phospholipid films are also central to the process of two-dimensional protein crystallization below a ligand-bearing film. Here, we study a binary mixture of phospholipids that form an insoluble monolayer on the air-water interface. Brewster angle microscopy reveals that a shearing flow induces a phase separation in the binary film, resulting in the appearance of 10 micron-scale dark domains. Hydrodynamic response of the binary film is quantified at the macro-scale by measurements of the surface shear viscosity, via a deep-channel surface viscometer. Reynolds number was shown to be a state variable, along with surface pressure, controlling the surface shear viscosity of a biotinylated lipid film.

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