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Monolayer phase coarsening using oscillatory flow J. LEUNG, A.H. HIRSA, Rensselaer Polytechnic Institute, J.M. LOPEZ, Arizona State University , M.J. VOGEL, Cornell University — The co-existing phase domains of monolayers commonly observed via microscope are examined on flowing systems. Recent evidence shows that co-existing phase domains have profound effects on monolayer response to bulk flow. The present flow geometry consists of an open-top rectangular cavity in which the flow is driven by the periodic oscillation of the floor in its own plane. The oscillation of the floor dilates and compresses any film at the gas/liquid interface while still maintaining an essentially flat interface. A range of flow conditions (oscillation frequency and amplitude) is chosen so that the flow remains essentially two-dimensional. Measurements at the interface, initially covered by an insoluble monolayer (vitamin K_1 or stearic acid), are made using a Brewster angle microscope system with a pulsed laser. Various phenomena such as fragmentation (breaking up of co-existing domains into finer ones) had previously been observed in sheared monolayer flows. In this new flow regime, we have seen dramatic coarsening of the domains. Interesting relaxation behavior at short and long time scales will also be discussed.

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