Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Role of disorder in cyclically-sheared 2D solids[1] NATHAN KEIM[2], PAULO ARRATIA, University of Pennsylvania — We consider how materials with different degrees of disorder respond to finite deformations, through both shear rheometry, and simultaneous tracking of many particles. Our experiments use mutually repulsive particles adsorbed at an oil-water interface, that with bidisperse particle sizes form a more amorphous packing, and with monodisperse sizes form a more polycrystalline packing. Under cyclic shear, we use the reversible plastic regime — in which rearrangements at a stable set of locations control deformation — to probe the origins of plasticity and yielding in each material. We find that the polycrystalline material, with fewer disordered regions, hosts rearrangements in fewer locations. However, the responses of the two materials are otherwise strikingly similar, including the sizes of the rearranging regions. This suggests that maximally-disordered materials provide the starting point for understanding finite-amplitude deformation of a broad range of soft solids.

[1]This work was supported by the Penn NSF MRSEC (DMR-1120901).
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Date submitted: 01 Aug 2014 Electronic form version 1.4