Supplementary Information for "Role of disorder in finite-amplitude shear of a 2D jammed material"

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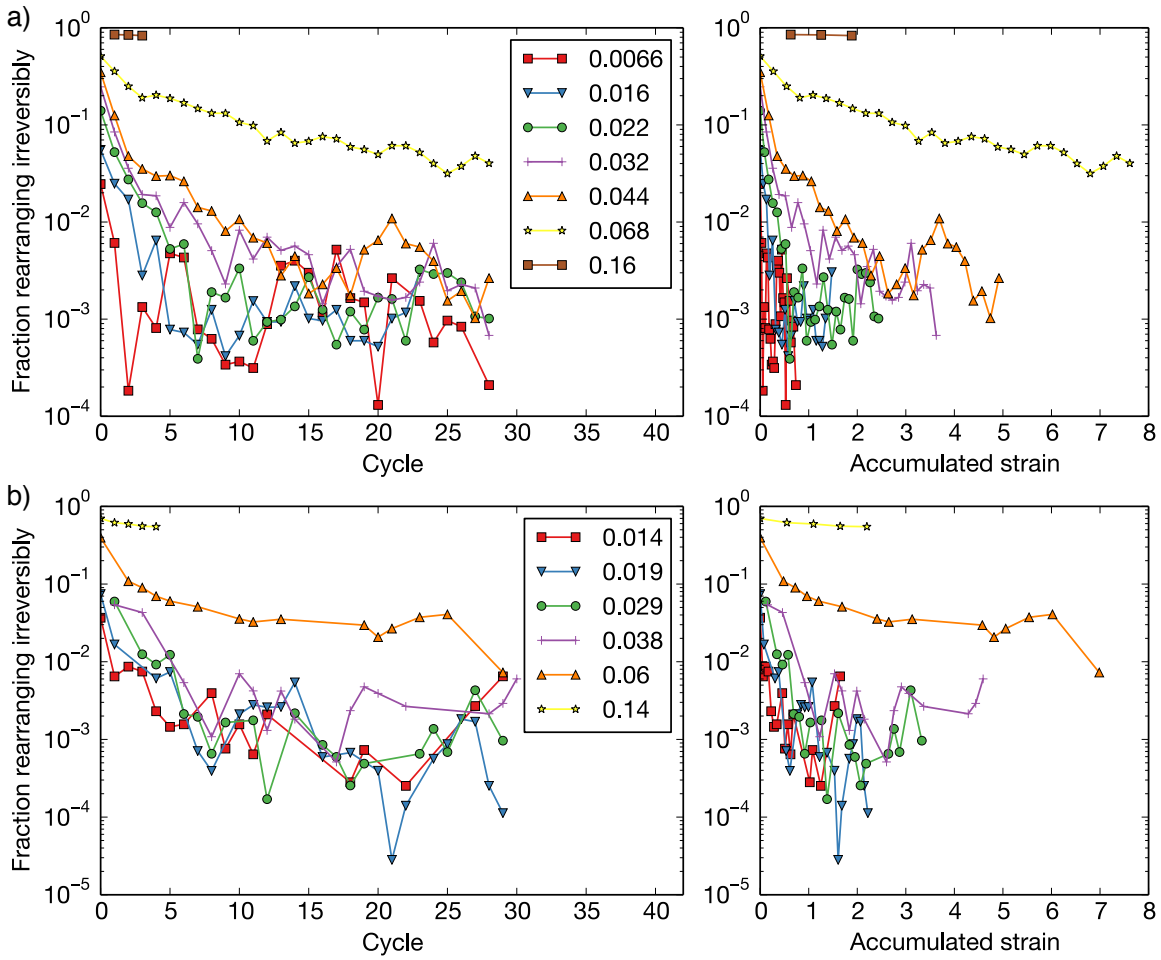

FIG. 1: Transient evolution of microstructure. For measurements of rearrangement activity in Fig. 3 of the main paper, we average over the steady state, which we define as beginning at the 15th cycle. **(a)** Left panel: Fraction of particles rearranging irreversibly in each cycle of movies of the bidisperse packing, at various γ_0. Right: Plotting the same data as a function of accumulated strain $\gamma_{\rm acc} = 4\gamma_0 n$, where n is the number of cycles, shows that the material requires more shearing to reach a steady state near the yielding transition. **(b)** Irreversible activity vs. cycle number for the monodisperse packing. Cycles with poor image quality were discarded; see Methods for details.

Caption for Supplementary Movie 1

Left: Video of a portion of the monodisperse packing, during a single cycle of deformation at $\gamma_0 = 0.038$. Particles that rearrange (total $D^2_{\rm min} \geq 0.015$) are highlighted in green; the images are cropped so that the large rearranging cluster is always centred. Legend at top shows global shear strain. **Right:** Tracked particle centres, coloured according to $D^2_{\rm min}$, which is computed relative to the beginning of the cycle. All rearrangements shown are reversed by the end of the cycle. The central rearranging cluster displays hysteresis: $D^2_{\rm min}$ rises significantly at $\gamma_{\rm on} \simeq 0.025$, but during reverse shearing does not fall until $\gamma_{\rm off} \simeq 0.005$. Note that just one video frame is included for every six in the original recording.