

Description of Additional Supplementary Files

Supplementary Movie 1 – Preformed lattices dispersed in a 1 mm capillary. The applied standing acoustic waves push crystallites into the nodes. Magnification is initially x10, and x50 towards the end of the video.

Supplementary Movie 2 – Preformed lattices dispersed in a 1 mm capillary. Standing acoustic waves are then applied, resulting in crystallites moving to the nodes. Crystal orientation was measured before and after the acoustic waves were applied.

Supplementary Movie 3 – Monomers of the octahedron origami were dispersed in a capillary. Lattices were formed with a thermal anneal (0.01 °Cpm) with no acoustic waves ($\tau=\infty$).

Supplementary Movie 4 – Monomers of the octahedron origami were dispersed in a capillary. Lattices were formed with a thermal anneal (0.01 °Cpm) with an acoustic wave pulse of 50 ms every 1 second ($\tau=20$).

Supplementary Movie 5 – Polystyrene beads of 1 μm diameter in a 1 mm wide capillary. The beads are dispersed in the capillary (left image) and then arranged by a pulse of 50ms acoustic waves every 1 second ($\tau = 20$).

Supplementary Movie 6 – Monomers of the octahedron origami were dispersed in a capillary. Lattices were formed with a thermal anneal (0.03 °Cpm) with acoustic wave pulse of 50 ms every 1 second ($\tau=20$).

Supplementary Movie 7 – Monomers of the octahedron origami were dispersed in a capillary. Lattices were formed with a thermal anneal (0.03 °Cpm) with acoustic wave pulse of 50 ms every 1 second ($\tau=100$).