Supplementary Information

Directed Assembly of Nanoparticles into Continuous Microstructures by Standing Surface Acoustic Waves

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Video SV1 Disassembly and re-assembly process of Ag NPs (1.5 wt %) with/without acoustic waves of 20Vpp.

Video SV2 Continuous flow directed assembly of silver lines by SSAWs while streaming a dispersion of Ag NPs (0.5 wt %) into a microfluidic channel filled with an HCl solution (1M). Gaps are reduced due to hydrodynamic pair attractions between driven particles. The video shows the same area as figures 8C-G.
**Fig. S1.** Directed assembly of Ag NPs at A,B) low intensities (15Vpp and 16Vpp, respectively) with 1.5 wt %, and C) low dispersion concentration (0.3 wt %) with 20Vpp. In all cases continuous lines were not formed.

**Fig. S2.** Width as a function of time for A) various wave intensities (for 2 wt % Ag concentration) and B) various Ag NP concentrations (wave intensity kept constant at 20 Vpp).
Fig. S3. Bright field microscopy images of continuous flow directed assembly of silver lines by SSAWs while streaming a dispersion of Ag NPs into a microfluidic channel filled with an HCl solution. The area influenced by the SSAWs (acoustic aperture) is marked with red brackets. B-E) Zoom in on the blue square in A) showing the formation of lines beyond the acoustic aperture at 1, 5, 15, and 25 s, respectively. t=0 is defined at the moment that Ag NPs are initially visible in the selected area. Scale bars: 100µm.

Fig. S4. Bright field microscopy images of silver lines pinned to imperfections on the glass surface beyond the acoustic aperture. The streaming lines fold on these spots. t=0 is defined at the moment that Ag NPs are initially visible in the selected area. Scale bars: 50µm.
**Fig. S5.** Bright field microscopy images of silver lines formed by continuous streaming and acoustic wave amplitude of 20 Vpp with dispersion concentrations of A) 0.1 wt %, B) 0.5 wt %, and C) 1 wt %. Insets show HR-SEM images of the same lines.

**Fig. S6.** An opaque microfluidic channel that was used for the described deposition process to demonstrate one of the advantages of acoustic deposition compared to optical deposition.