Supplementary information

For

On-Demand Biofilm Removal by Shape-Memory Triggered Local Changes in Surface Topography

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Validation of the shape recovery properties

To determine the shape recovery rate of prewet and dry SMP at different temperatures, we prepared SMP specimen stretched to ~170 % (horizontally) elongation. The samples were immersed in saline buffer or in dry air at 25°C before inducing shape recovery by transferring to 37°C, 40°C, or 45°C prewarmed buffer.

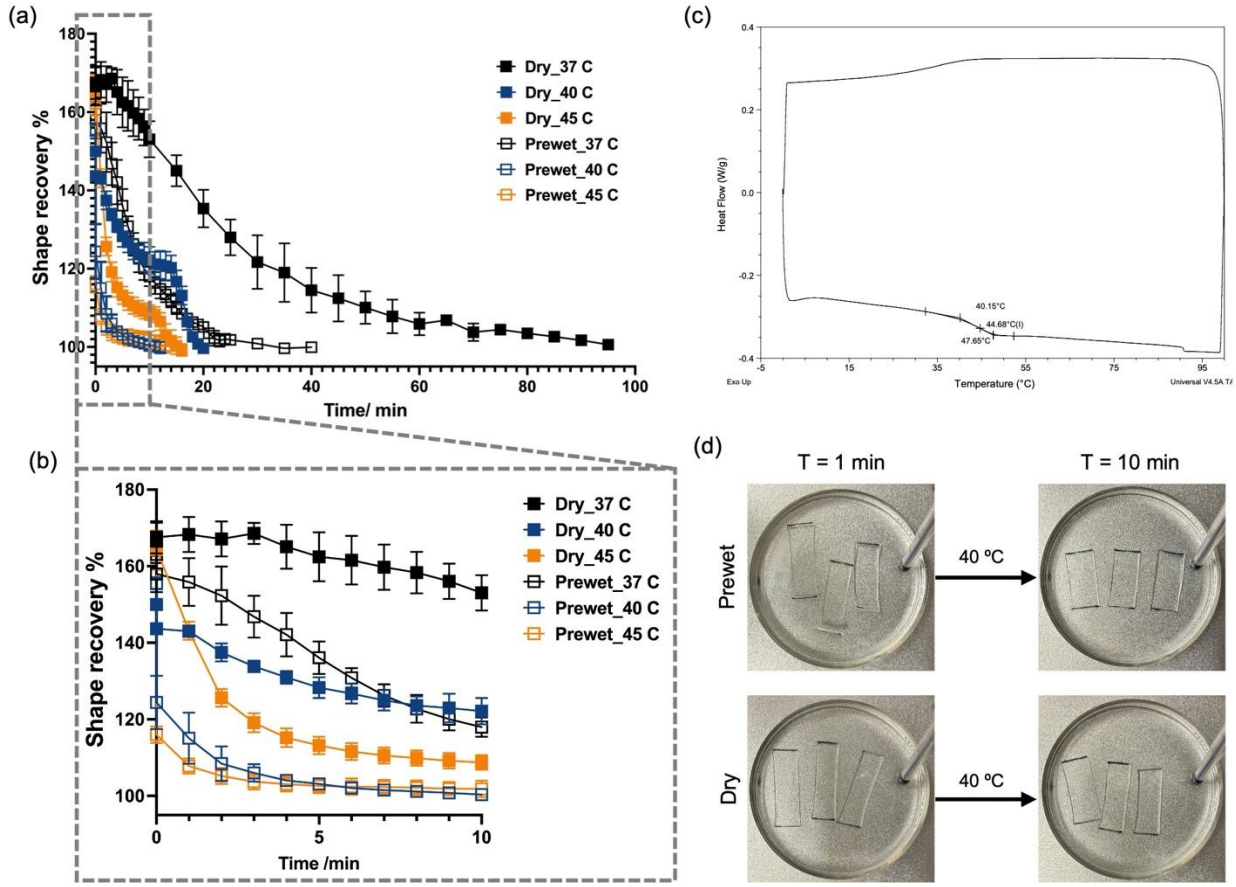

Fig. S1. Real-time shape recovery (%) normalized by intial length with or without prewetting triggered with 37°C, 40°C and 45°C of prewarmed buffer. (a) Shape change over the full incubation time. (b) Zoom-in view of the first 10 min. (c). T_g and $T_{g,\,onset}$ determined by Differential Scanning Calorimetry (DSC). (d). Images of prewetted SMP and dry SMP with shape receovery triggered with 40°C prewarmed buffer. Means ± SE are shown for (a) and (b) (n = 3).

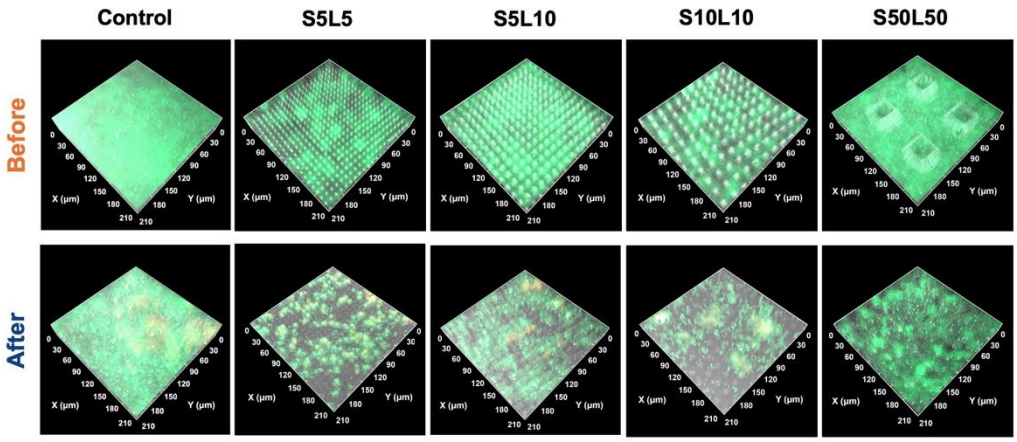

Fig. S2. *P. aeruginosa* PAO1 biofilm removal by shape recovery of square patterns. Overlay images of fluorescence and brightfield show PAO1 biofilms grown on surfaces tested including **Control**, **S5L5**, **S5L10**, **S10L10**, and **S50L50**. Shape recovery was triggered by transferring samples from room temperature to 40°C and incubated for 10 min in 0.85 wt% NaCl solution.

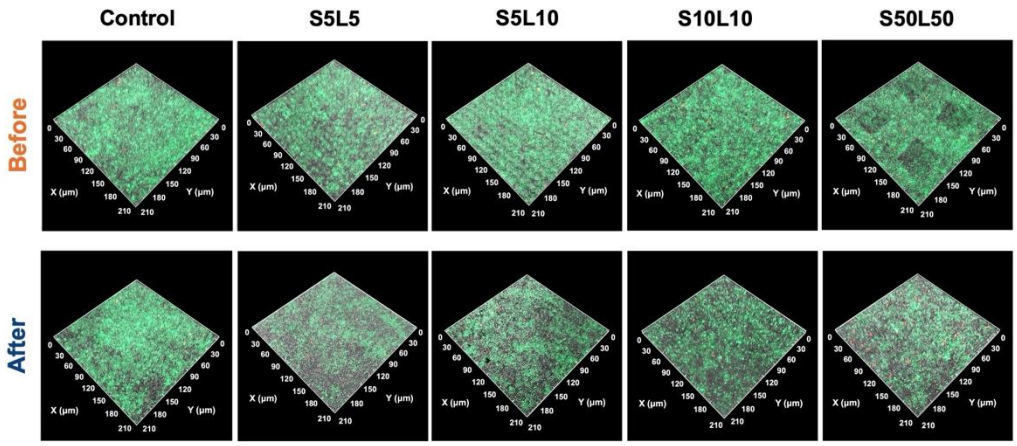

Fig. S3. *E. coli* RP437 biofilm removal by shape recovery of square patterns. Overlay images of fluorescence and brightfield show PAO1 biofilms grown on surfaces tested including **Control**, **S5L5**, **S5L10**, **S10L10**, and **S50L50**. Shape recovery was triggered by transferring samples from room temperature to 40°C and incubated for 10 min in 0.85 wt% NaCl solution.

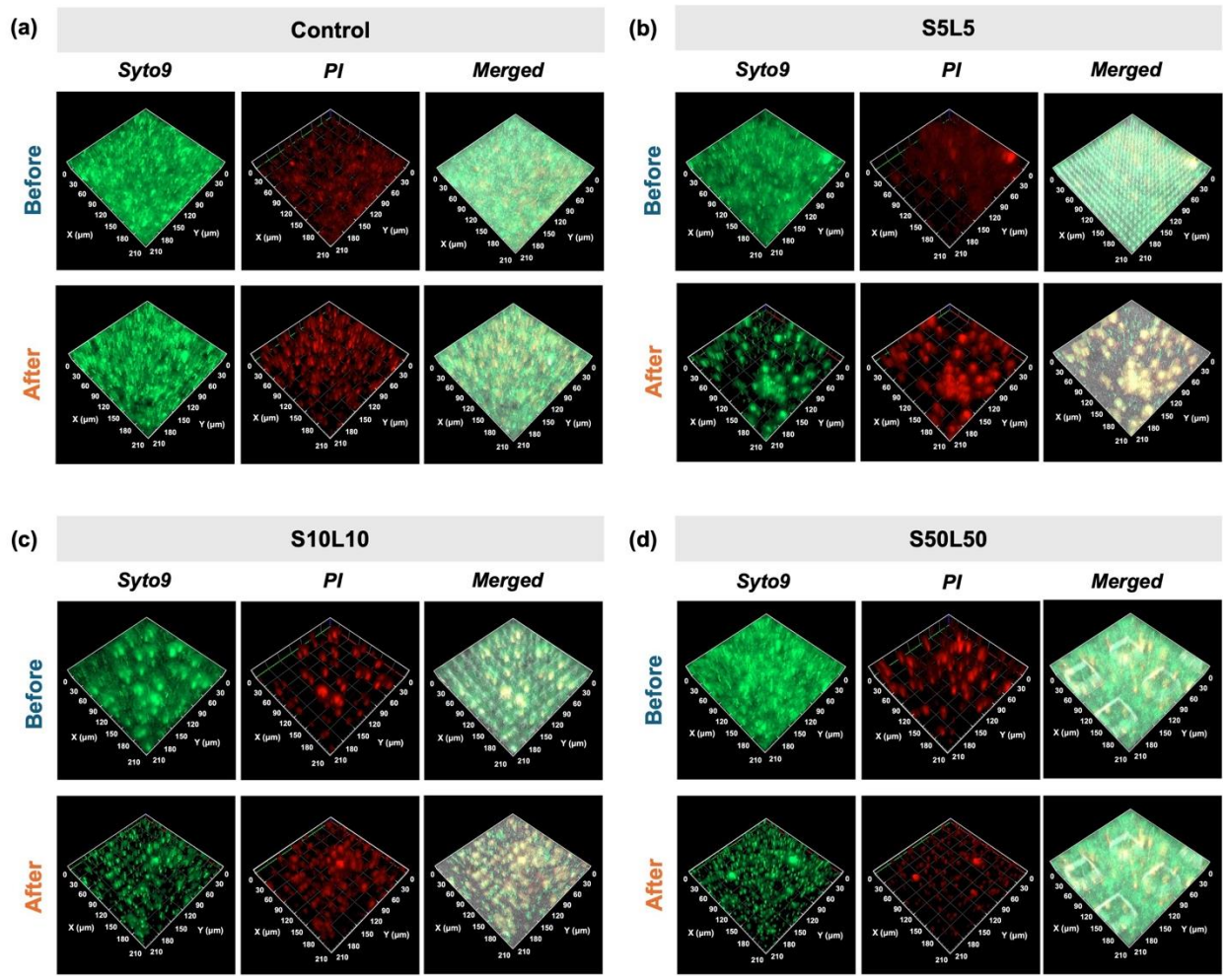

Fig. S4. Antibiotic treatment of biofilms before and after shape recovery. Representative 3D fluorescence images and overlay images of fluorescence and brightfield are shown. *P. aeruginosa* biofilms were grown on surfaces tested including **Control**, **S5L5**, **S10L10** and **S50L50**. Shape recovery was triggered by transferring samples from room temperature to 40°C and incubated for 10 min in 0.85 wt% NaCl solution. The biofilms were treated with 32 μg/mL tobramycin for 2 h at room temperature and stained with Live/Dead staining kit.

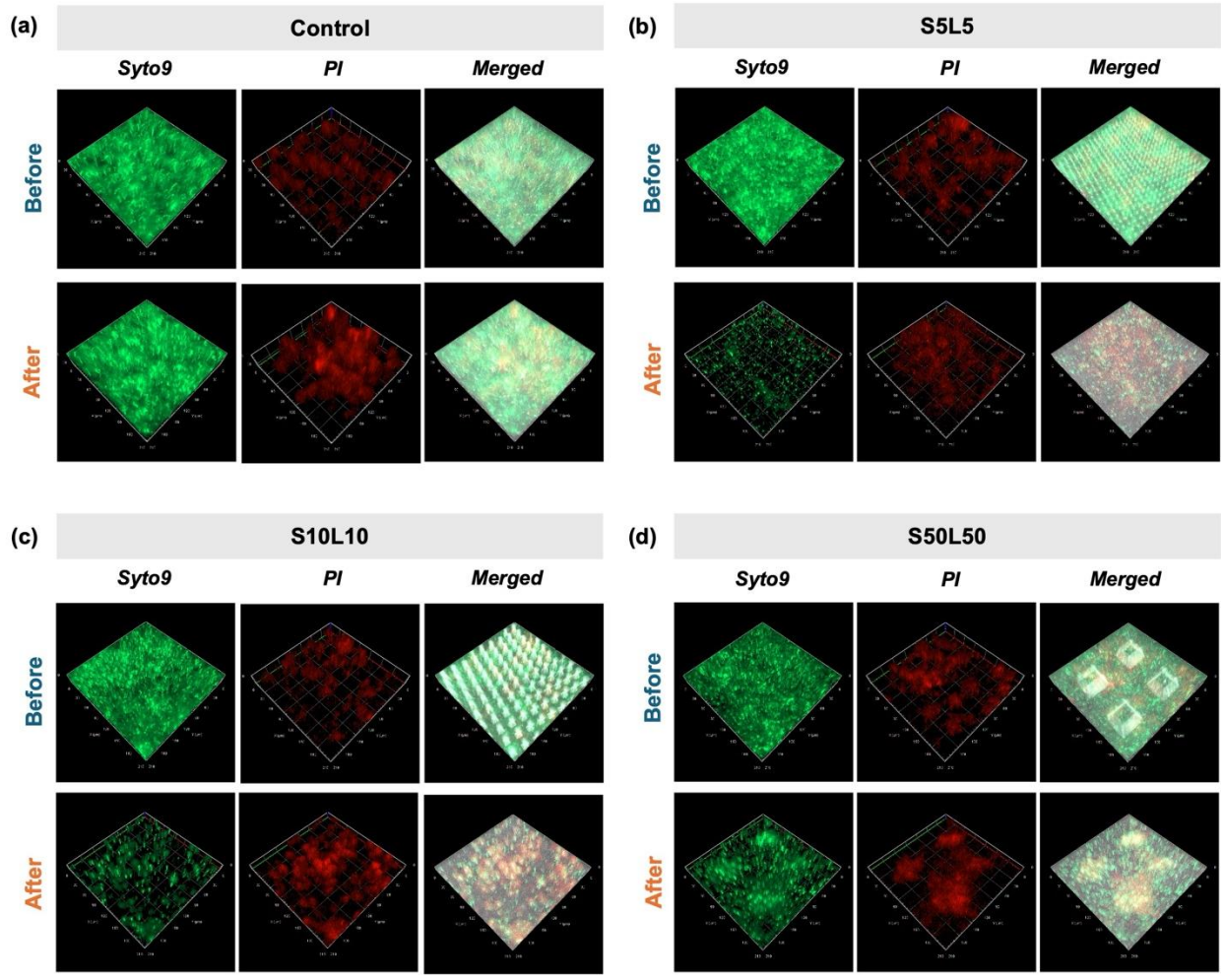

Fig. S5. Antibiotic treatment of biofilms before and after shape recovery. Representative 3D fluorescence images and overlay images of fluorescence and brightfield are shown. *P. aeruginosa* biofilms were grown on surfaces tested including **Control**, **S5L5**, **S10L10** and **S50L50**. Shape recovery was triggered by transferring samples from room temperature to 40°C and incubated for 10 min in 0.85 wt% NaCl solution. The biofilms were treated with 5 μg/ml ofloxacin 2 h at room temperature and stained with Live/Dead staining kit.

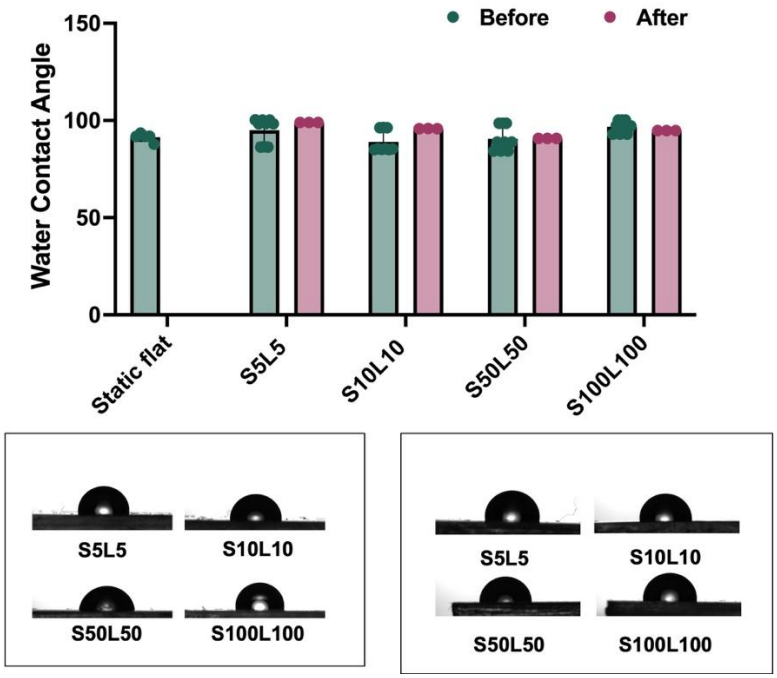

Fig. S6. Contact angle of different patterned surfaces of SMP.