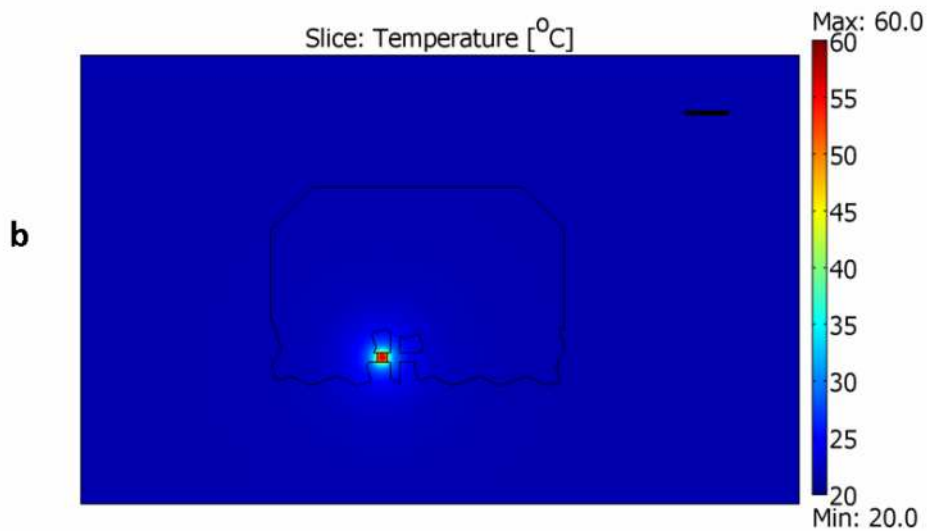
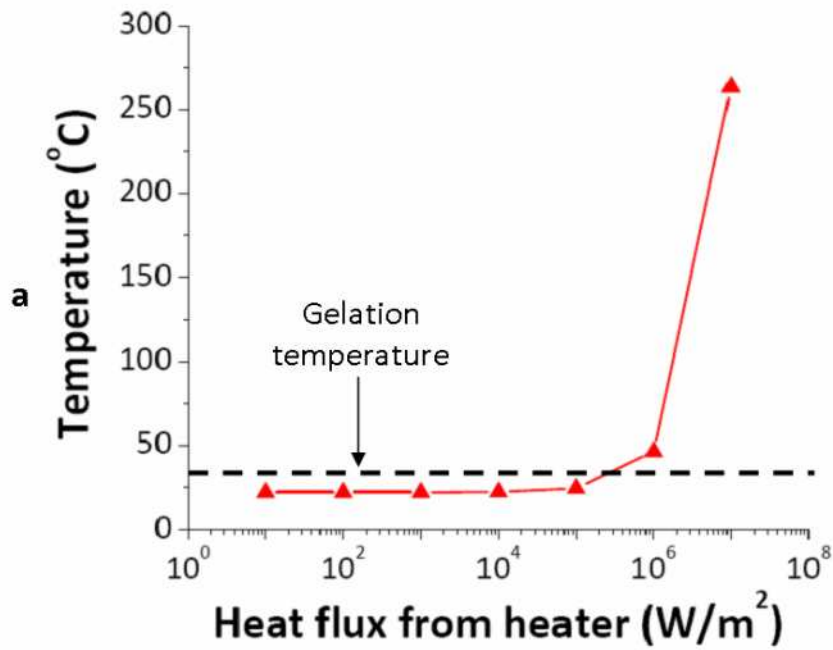


## **Supplemental Information**

### **Numerical Analysis**

The heaters were designed by carrying out numerical analysis using the commercial software Comsol Multiphysics to estimate the power required by the microheaters to cause the thermorheological fluid to transition to a gel state. The geometry used for these simulations was the same as that used in the experiments, and we solved for heat flux conditions ranging from  $10 \text{ W/m}^2$  to  $10^7 \text{ W/m}^2$ . Supplemental Figure S1 shows the results from our simulations. It can be seen from Fig. S1 that for a flux of  $10^6 \text{ W/m}^2$ , we have an average channel temperature of approximately  $50 \text{ }^\circ\text{C}$ , which is sufficient for gelation. Thus, this was the flux that the heaters were designed to provide.



**Figure S1 Numerical analysis** a, Graph showing the predicted average temperature within a channel in the mock tile for different heat fluxes. It was found that a flux of order  $10^6 \text{ W/m}^2$  was needed for successful affinity switching. b, Simulated temperature profile in the microfluidic assembly chamber for a flux of  $10^6 \text{ W/m}^2$ . The scalebar in the image is 500  $\mu\text{m}$ . The legend indicates temperature in  $^{\circ}\text{C}$ .