**Bacteria propagation**

*Escherichia coli* (ATCC 25922) were obtained from the American Type Culture Collection (ATCC, Manassas, VA) and rehydrated with 5 mL of tryptic soy broth (TSB) (Becton Dickinson, Franklin Lakes, NJ). The rehydrated culture was inoculated onto tryptic soy agar (TSA) plates (Becton Dickinson). The plates were incubated overnight at 36.5±1°C. Single colonies were transferred to 30 mL of TSB, and then incubated overnight at 35°C at 100 rpm in a shaking incubator. The culture was centrifuged at 3000 rpm for 5 min and the pellet was resuspended with 30 mL of PBS buffer.

**Live/Dead stain**

After heat treatment, the filters were stained using the Live/Dead BacLight Bacterial viability kits (Life Technologies, Eugene, OR). Briefly, equal aliquots of SYTO 9 and Propidium iodide were applied onto the filters to stain the cells directly. The filters were incubated in the dark at room temperature for 15 min and then filtered under slight vacuum to remove the stain solution. The filters were mounted on a pre-cleaned microscope slide and then a coverslip was placed over the BacLight mounting oil drop. The stained cells were examined under a fluorescence microscope within 24 hours.