Electronic Supplementary Material (ESI) for Lab on a Chip.

Supplementary Information

Real-time multiplexed PCR using surface enhanced Raman spectroscopy in a thermoplastic chip

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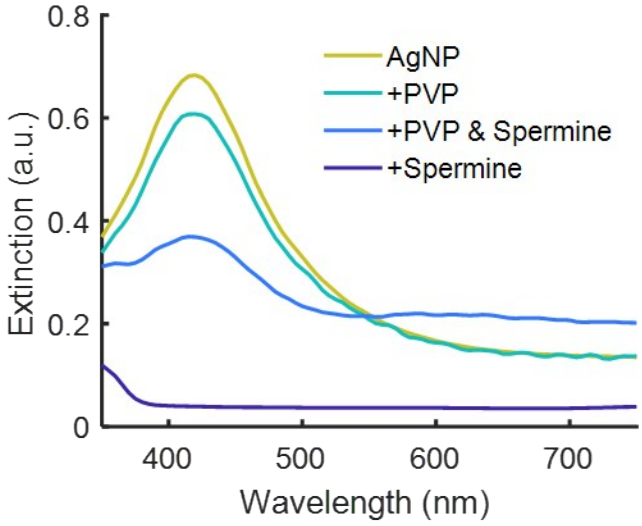

Figure S1: Extinction spectra of nanoparticle solutions. Solutions were prepared according to details (see Nanoparticle Synthesis in Materials and Methods) and diluted by 100-fold to enable passage of sufficient light. Extinction spectra indicate stable colloidal nanoparticles with and without PVP present. In the presence of spermine, aggregates form a stable suspension with PVP, but immediately precipitate without a stabilizing agent.

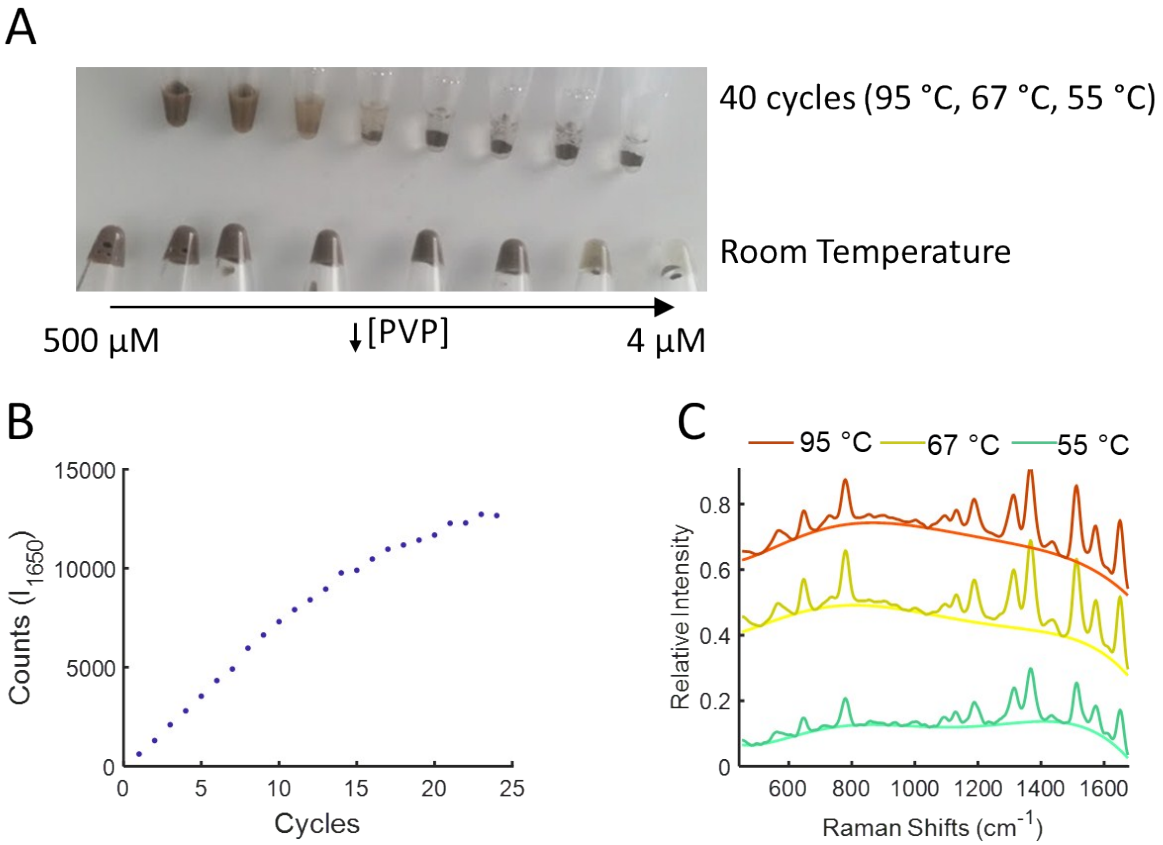

Figure S2: Stability of nanoparticle aggregates and SERS performance after thermocycling. A: Photographic evidence of PVP dependent stability of spermine aggregated nanoparticles. PVP concentration decreases towards the right of the image by a factor of two (500 µM, 125 µM, 62.5 µM, 31.25 µM, 15.63 µM, 7.81 µM, 3.90 µM). The rows show thermocycled and room temperature incubated samples on the top and bottom respectively. The accelerated precipitation of the nanoparticles is visible for nanoparticle solutions with low PVP concentrations. B: SERS performance of nanoparticles that have been thermocycled. After 37 cycles of the reported protocol, the solution in the PCR well was replaced with an exonuclease degraded MecA probe. The same chip was then cycled for another 25 cycles and SERS signals were acquired. Strong SERS signals were produced comparable to those acquired from fresh nanoparticles (Figure 5); thus, no significant loss in SERS performance is expected over the length of a normal reaction. C: Endpoint comparison of SERS signals and calculated fluorescent background (sextic fit) of samples used in Figure 5. The broad fluorescent peak of R6G (visible at 800 cm^{-1}) is visible in each normalized signal, but is slightly more pronounced at higher temperatures.