Supplementary Material (ESI) for Lab on a Chip

Supplementary Information for Lab on a chip

Electrokinetically active microwells for enhanced on-chip SERS detection

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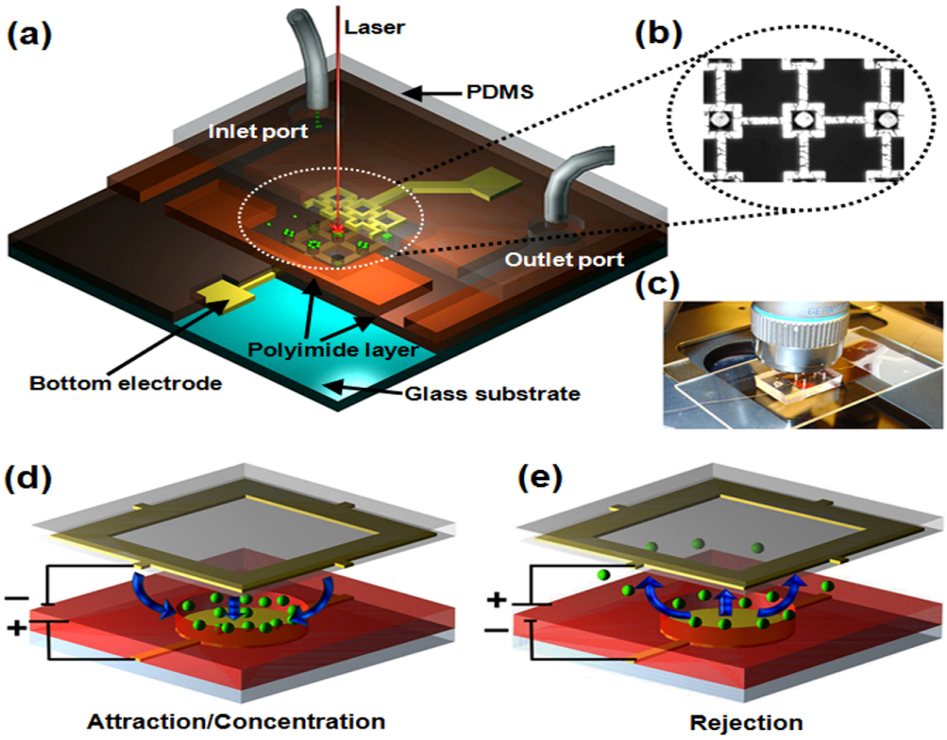

Figure S1. Illustration electroactive microwell device for SERS based nucleic acid detection (a) Schematic representation of the system showing the lower electrode on the Pyrex glass substrate, the microwell array (diameters of 10 µm and height of 8 µm), and the upper electrically functionalized PDMS gold electrode. Microchannels used to transport the sample and Raman enhancers into the mixing chamber are labelled as inlet ports. (b) The upper gold electrode patterned PDMS layer (c) The optical arrangement for recording the SERS signal. (d)-(e) 10 µm electroactive microwells are used to attract and concentrate SERS enhancers from the solution so they can be optically probed. Applying the polarity shown in (d) attracts particles and (e) rejects them.

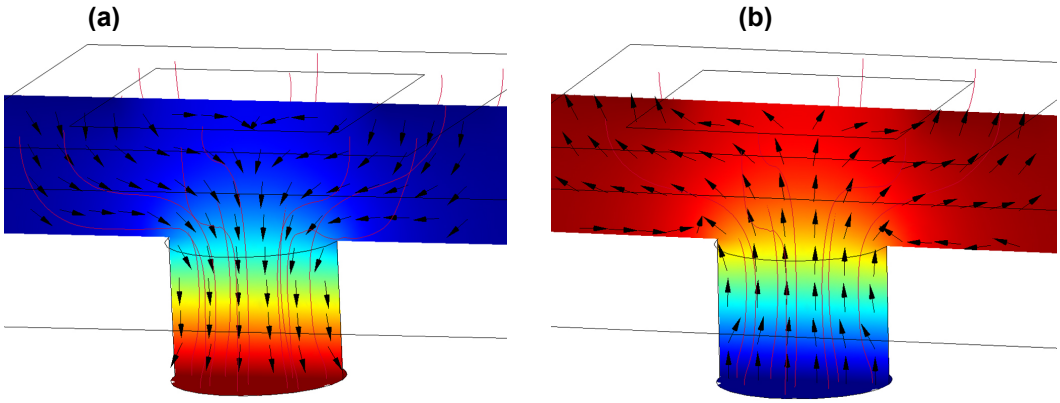

Figure S2. Finite element simulations of the transport process of mixing. (a) Net electrokinetic transport streamlines for trapping, (b) Streamlines when potential polarity is reversed. Colour contours show applied potential ranging from blue (ground) to red (1.0 V).

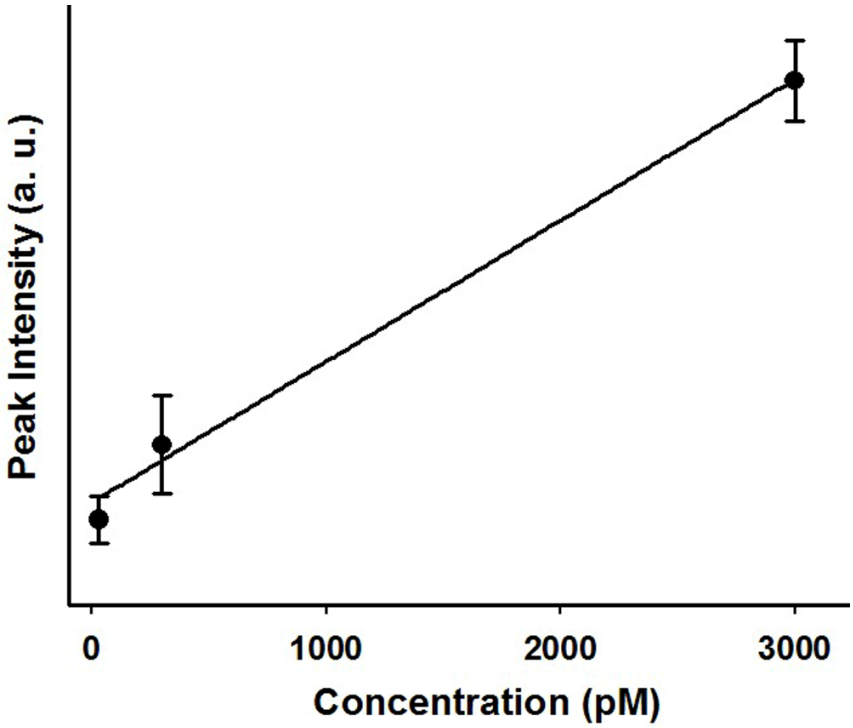

Figure S3. Plot of normalized peak intensity as a function of concentration (correlation coefficient: R=0.990). Note that the 3pM result is omitted since the concentration was below the limit of detection.