Supplementary Material (ESI) for Lab on a Chip

Label-Free and Highly-Sensitive Biomolecular Detection using SERS and Electrokinetic Preconcentration

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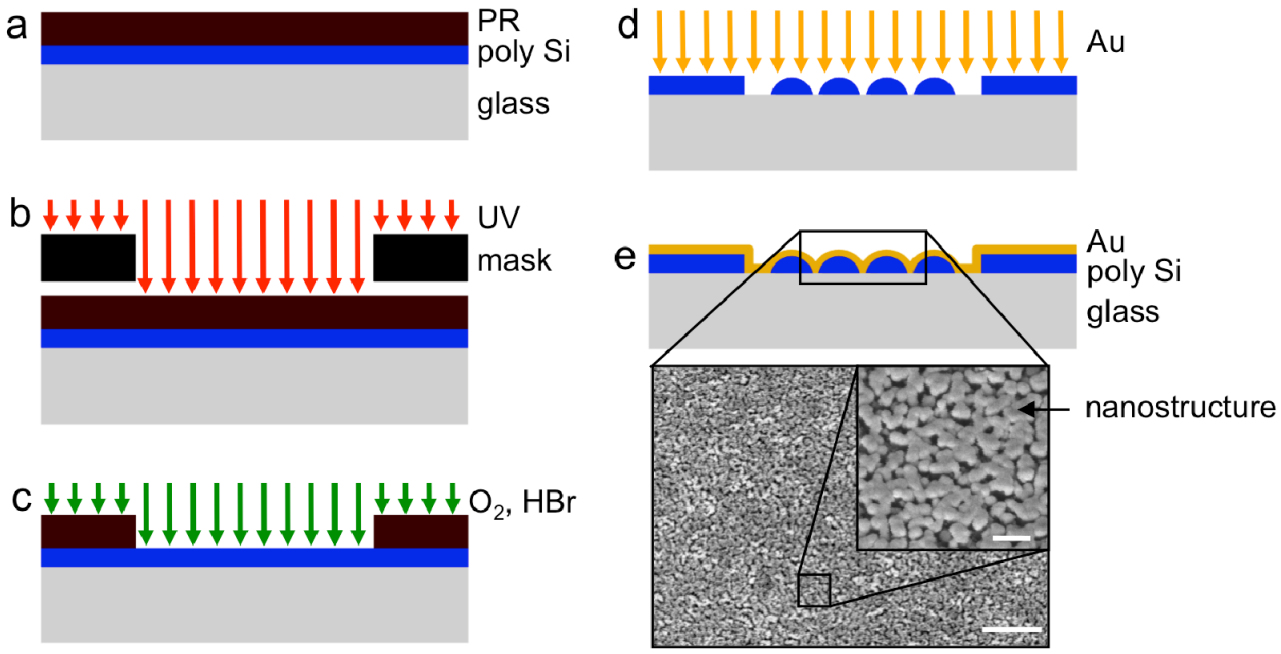

Figure S1. Fabrication of SERS substrate. (a) A glass wafer is deposited with polysilicon of 300 nm in thickness and coated with photoresist. (**b)** The area for SERS sites is defined with standard photo lithography. (**c)** The exposed polysilicon surface is roughened by RIE etching, which generates hemispheric structures on the glass wafer. (**d)** Au 40 nm in thickness is deposited onto the whole polysilicon surface, and a nanostructure is fabricated on the roughen area. **(e)** SERS-active substrate is created on the roughened area in a conductive surface. Insets are SEM images of the SERS-active nanostructures. Scale bars are 1 μm and 200 nm inset respectively.

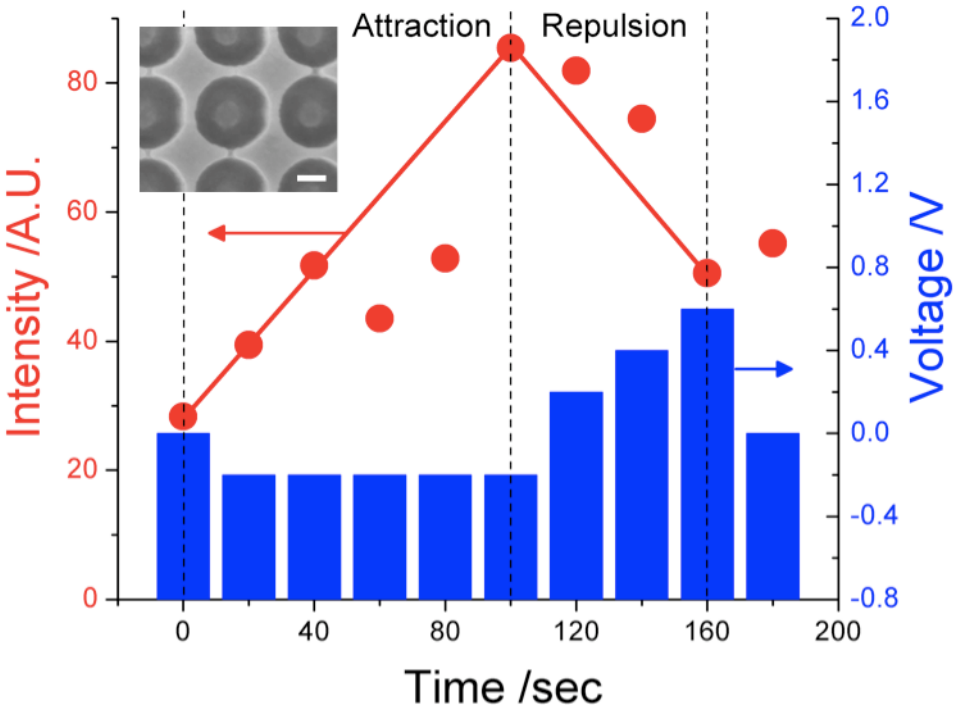

Figure S2. Molecular movement depending on the direction of electric field. Adenine was attracted onto the negatively charged plate electrode (SERS substrate) along the electric field, and the SERS signal kept increased under the same intensity of the electric field. Attracted adenine was removed and the SERS signal decreased when the repulsive electric field was applied. The SERS spectra were measured with a silicon-based SERS substrate coated with Ag/Au of 30/15 nm and a 785 nm excitation laser of 90 mW in an integration time of 10 s. Inset shows the SEM image of silicon-based SERS substrate, and the scale bar is 100 nm.