Electronic Supplementary Material (ESI) for Analyst.

Supplementary Information

Trapping of Au Nanoparticles in a Microfluidic Device using Dielectrophoresis for Surface Enhanced Raman Spectroscopy

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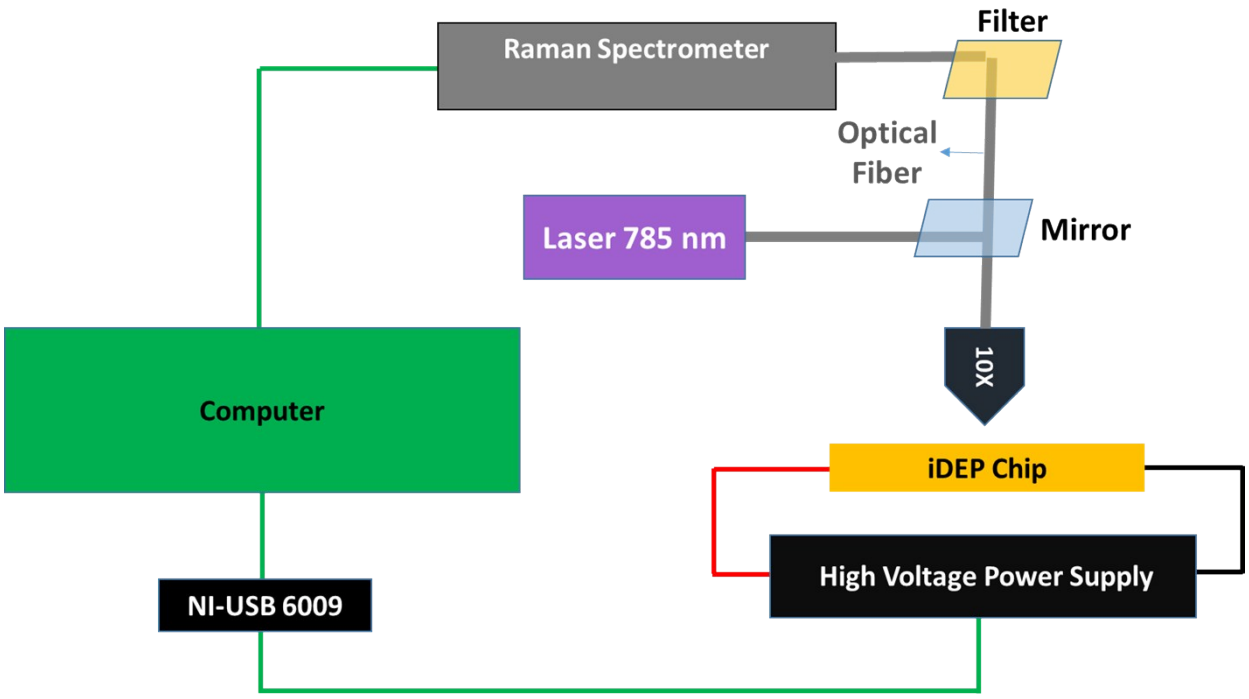

Fig. SI1: Instrumental setup used for iDEP-Raman

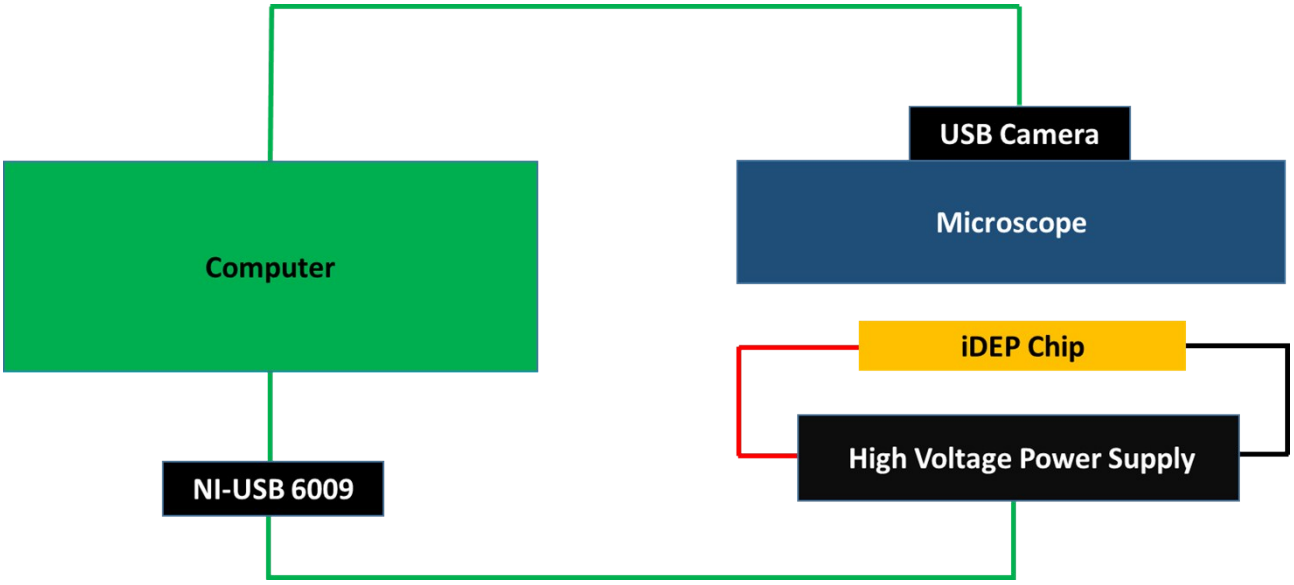

Fig. SI2: Instrumental setup used for image and video capture.

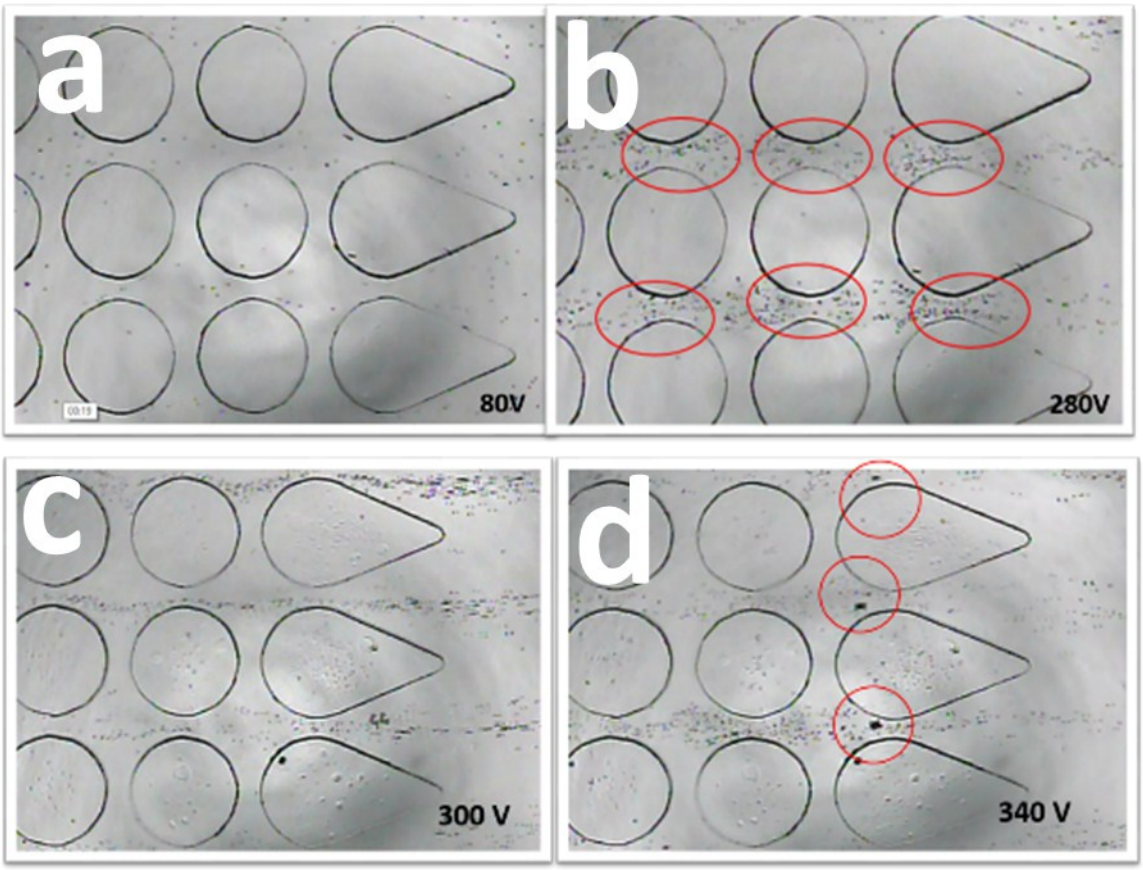

Fig. SI3: Dielectrophoresis of PS beads dispersed in phosphate buffer, pH 4.0, and applied voltage of (a) 80 V, (b) 280 V, (c) 300 V, and (d) 340 V. It is possible to visualize the streaming regime (b and c) and trapping regime (d). The circled areas in red highlight these regimes at 280 V and 340 V. The pillars have diameter of 200 μm.

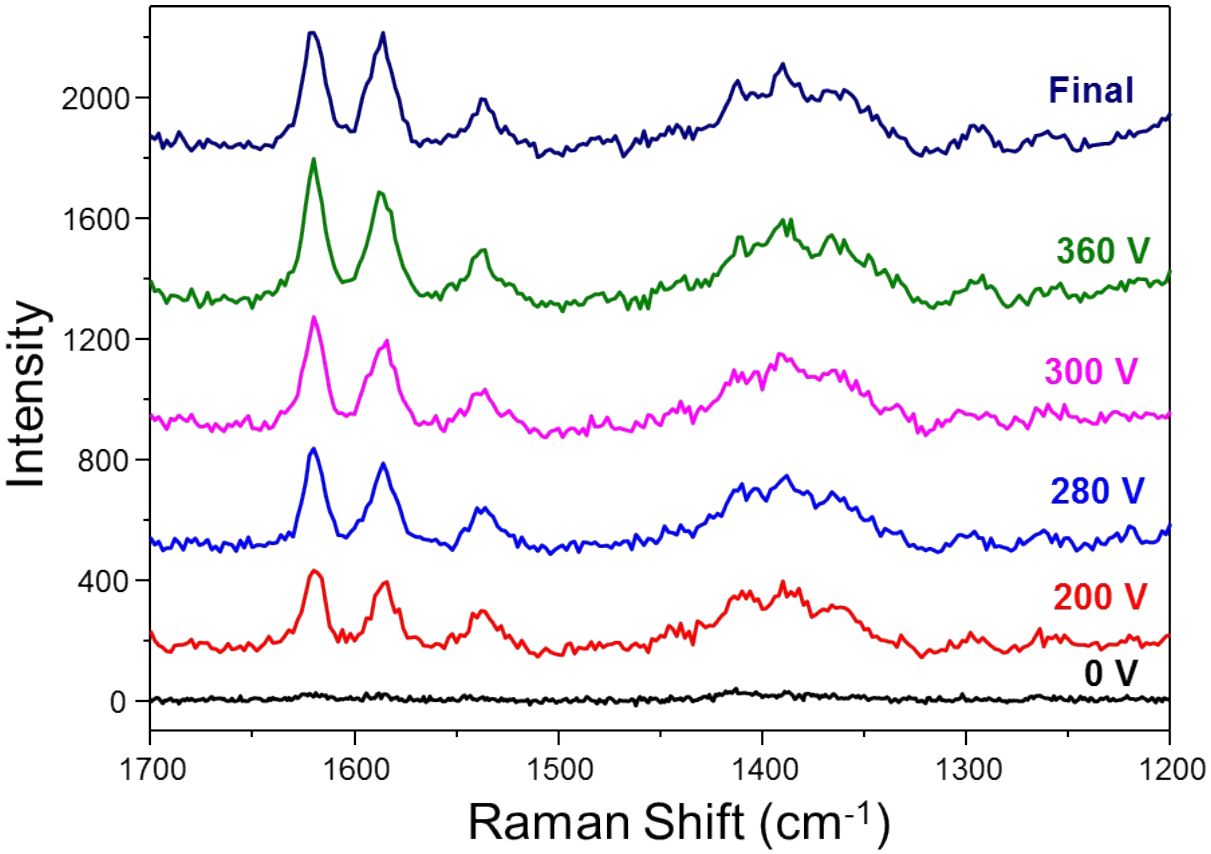

Fig. SI4: Raman spectra of 100 ppm Crystal Violet in 25 mmol L^{-1} phosphate buffer containing 3 mmol L^{-1} SDS, pH 7, using 80 nm nanoparticles (AuNP1). Spectra were recorded for applied voltages of 0, 200, 280, 300, 360, and 360 V. The spectrum indicated as final was recorded after turning off the high voltage power supply. Conditions: Raman Station 400 equipment (Perkin Elmer) laser excitation of 785 nm and 250 mW (laser 100%, 2 exhibition 2s-25 cycles).

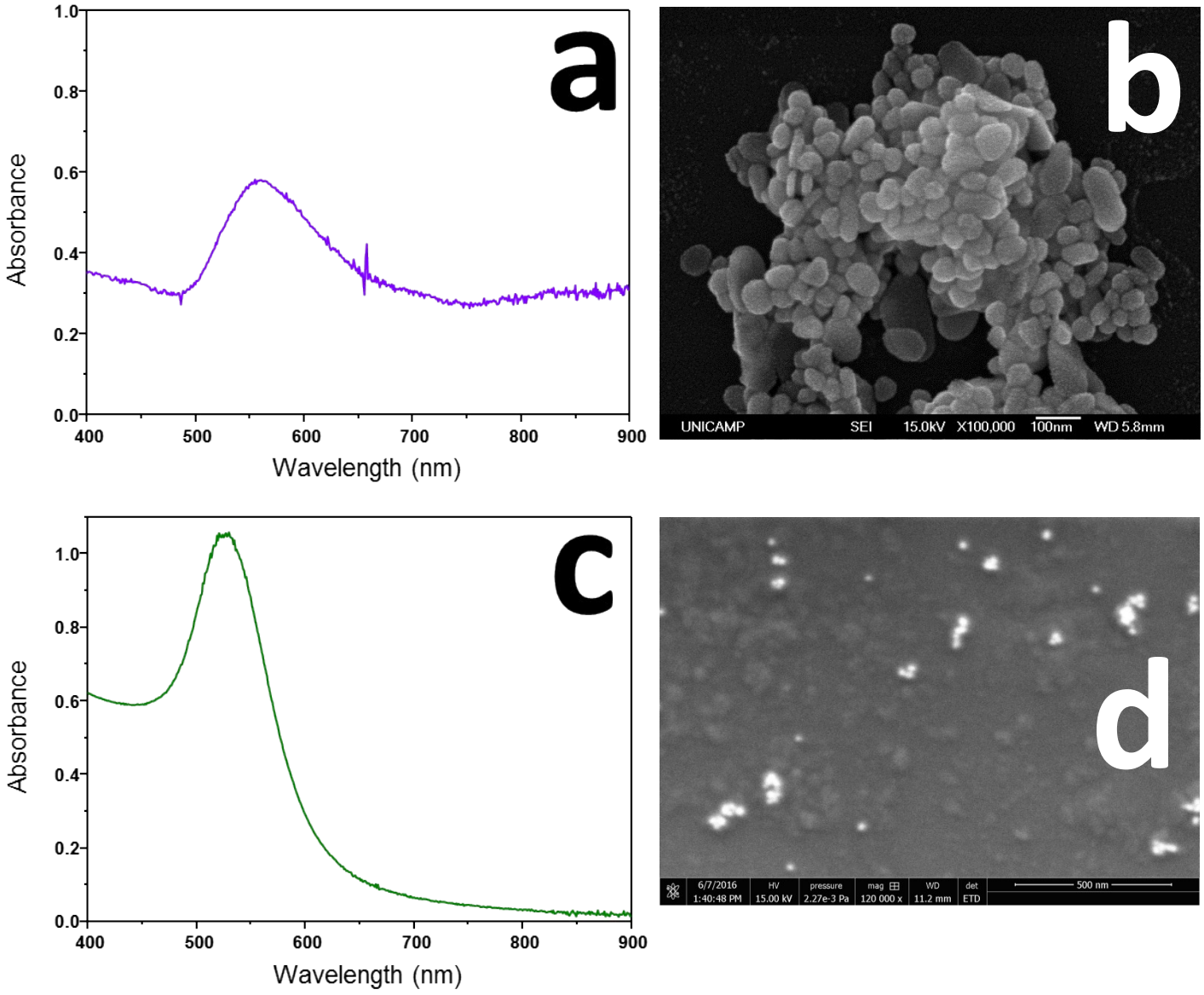

Fig. SI5: UV-vis spectra and scanning electron microscopy of AuNP1 (a and b) and AuNP2 (c and d). Average diameter of AuNP1 and AuNP2 are 80 and 20 nm, respectively.

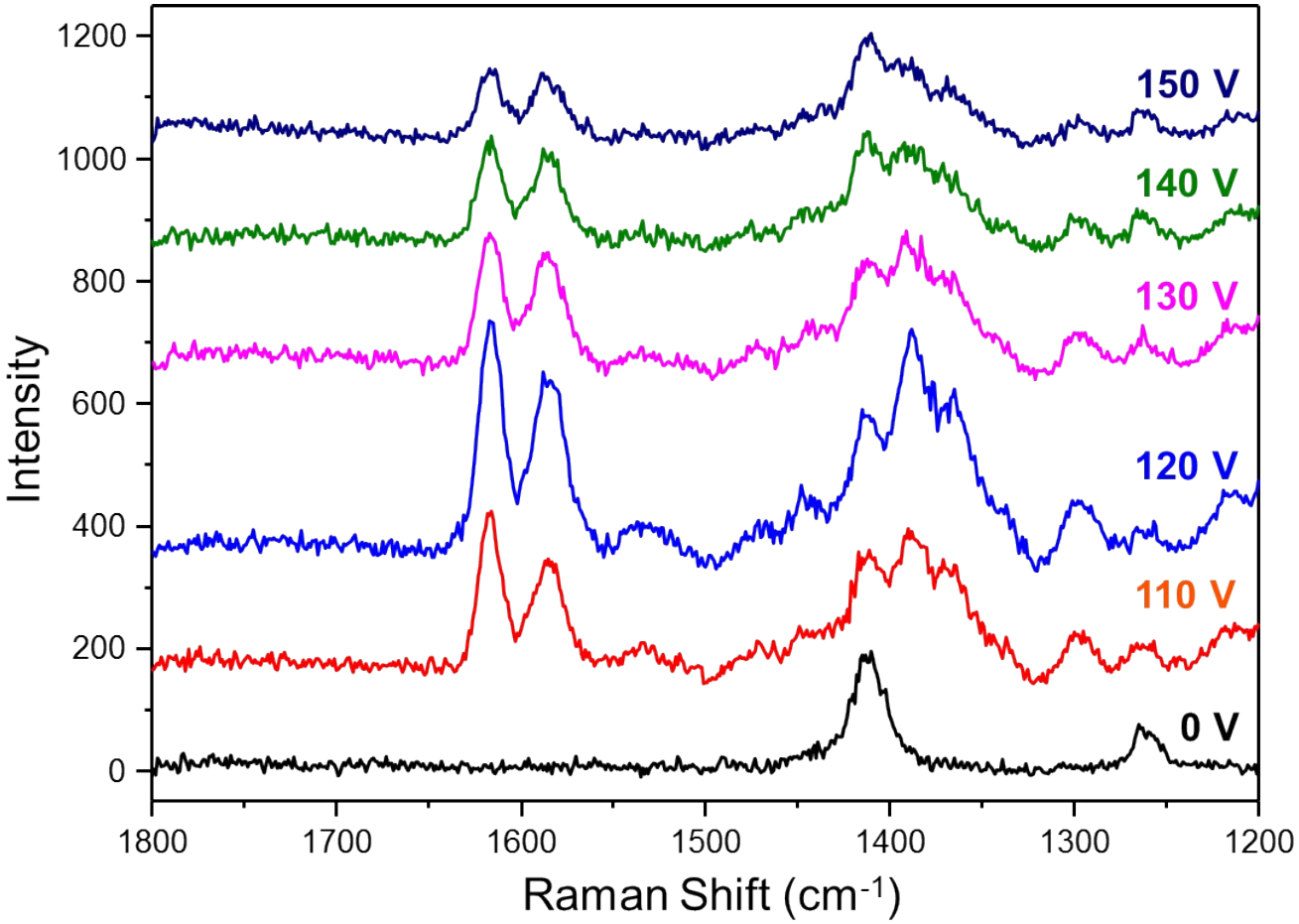

Fig. SI6: Raman spectra of Crystal Violet 100 ppm 25 mmol L^{-1} phosphate buffer containing 3 mmol L^{-1} SDS, AuNP 2 (20 nm), and with 5 mmol L^{-1} sodium chloride at pH 7 during iDEP varying the applied potential from 0 to 100 V. Other conditions as in Fig. SI4.

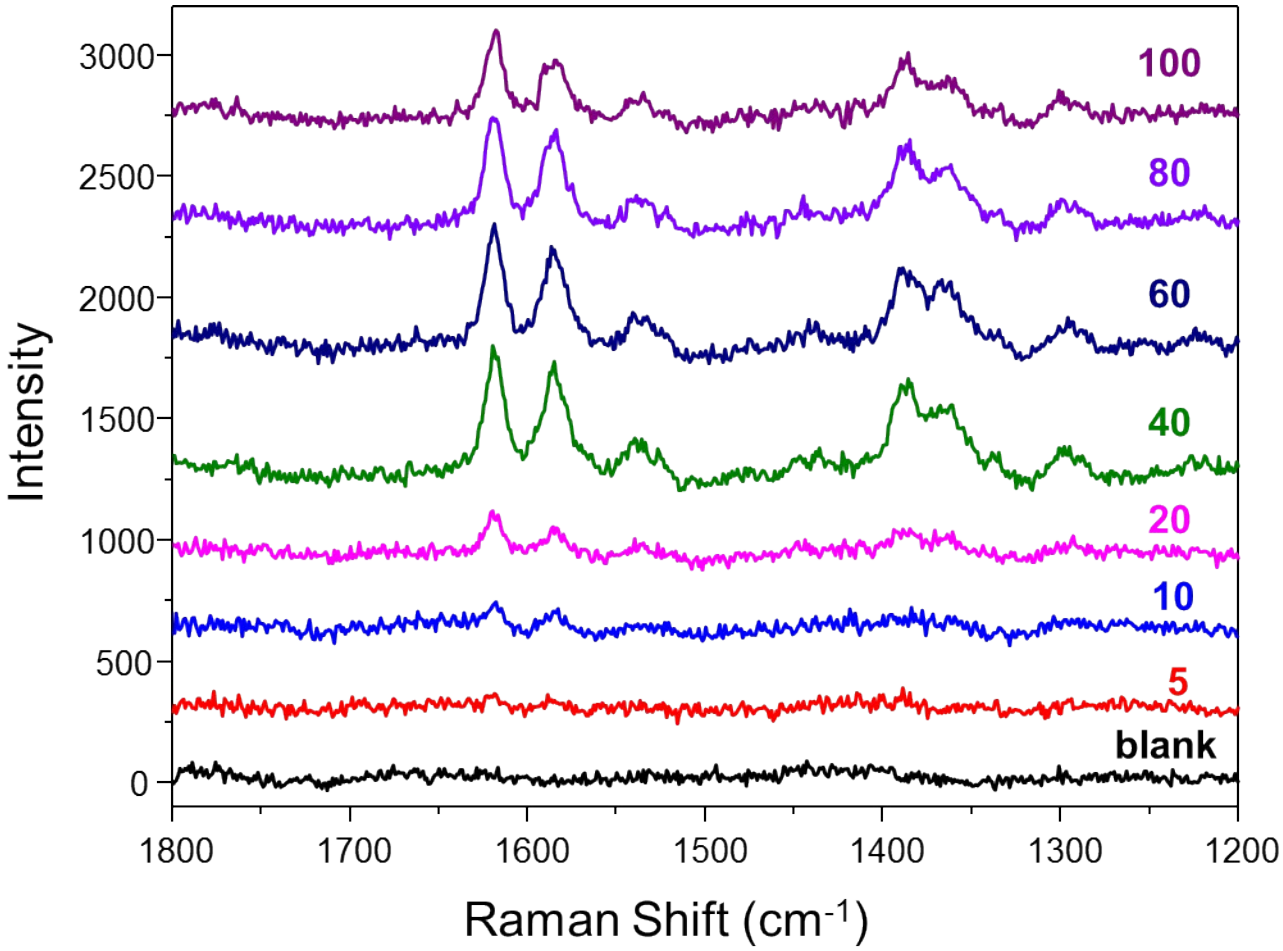

Fig. SI7: Raman spectra of Crystal Violet 100 ppm in 25 mmol L^{-1} phosphate buffer containing 3 mmol L^{-1} SDS and AuNP2 (20 nm) with different concentrations of sodium chloride (in mmol L^{-1}). No voltage was applied to the iDEP microchip during these experiments. Other conditions as in Fig. SI4.

Fig. SI8: QR Code for the video of AuNPs trapping at pH 4. Alternatively, the video can be found at: http://m.youtube.com/watch?feature=youtu.be&v=rRow4Fp4Ay8