Electronic Supplementary Material (ESI) for Lab on a Chip

Supplementary Information

On-Chip Ultra-Thin Layer Chromatography and Surface Enhanced Raman Spectroscopy

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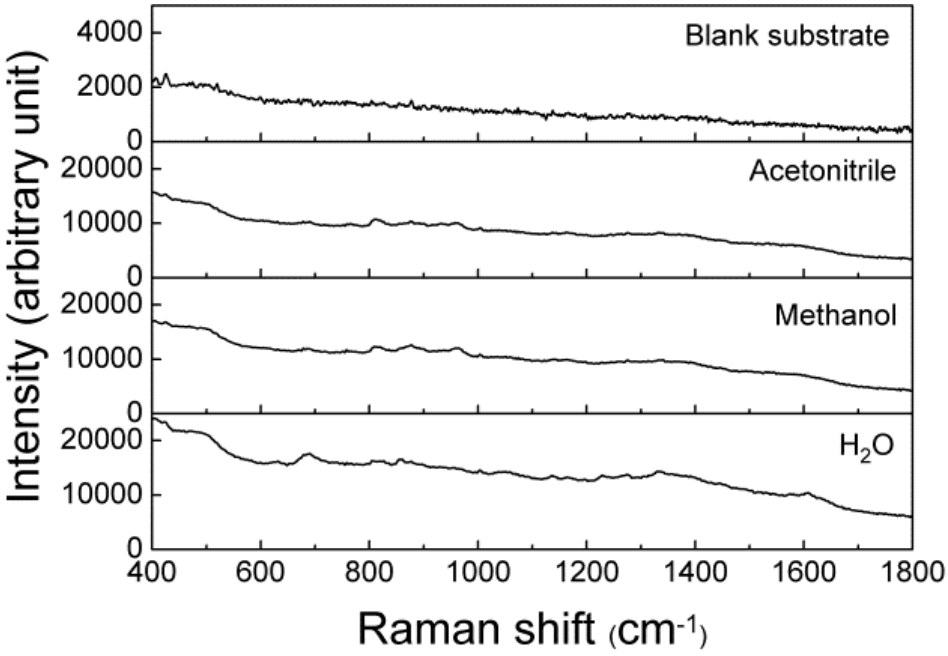
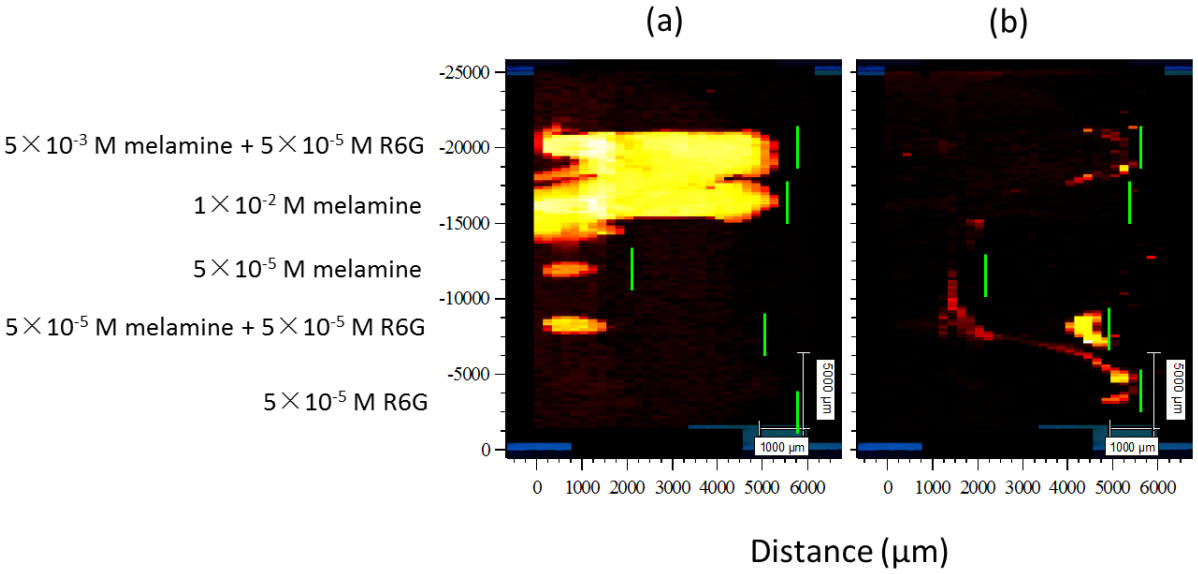
Supplementary Figure S1 SERS spectra of AgNR substrates pre-treated with mobile phase solvents



Supplementary Figure S2 Spatially-resolved SERS intensity map of **(a)** melamine (700 cm^{-1}) and **(b)** R6G (610 cm^{-1}). SERS spectra were acquired with a Renishaw inVia Raman Microscope with a step size of 200 μm. The intensity of the melamine and R6G peaks are represented with a color scale in which black=zero intensity, red=low intensity, yellow=high intensity, and white=maximum intensity. Green lines represent the solvent front. In this case the solvent front is crooked due to uneven side edges of the substrate and disturbed solvent migration, causing the R6G molecules on the two side lanes to migrate towards the center lanes with the solvent front. At high concentrations, the melamine molecules tend to form a multilayer on the substrate, and the excess molecules are available for being carried by the mobile phase to the front. At a lower concentration, the melamine molecules are likely to form a single layer and remain near the sample origin.



Supplementary Figure S3 Point-to-point fluctuation of the AgNR array substrates. Two 1 inch×1 inch substrates were soaked in 0.1 mM mercaptophenonol (MPh) for 30 min. The substrates were then gently rinsed with DI water to remove unadsorbed MPh molecules and dried with N_2. SERS spectra were collected along a straight line with a spatial interval of 0.5 mm from one edge of the substrates to the other. This is to simulate the process of spectra collection after the UTLC development. The spectra were then fitted to the 1070 cm^{-1} peak of MPh, and the peak intensity I_{1070} is used to calculate the point-to-point relative standard deviations (RSDs) of the substrates. The results indicate that the AgNR arrays are highly reproducible SERS-active substrates with intra-substrate RSDs <8%.