

Supporting Information

Routine Femtogram-Level Chemical Analyses Using Vibrational Spectroscopy and Self-Cleaning Scanning Probe Microscopy Tips

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Confirmation of the experiment on polystyrene: In the primary manuscript, we have selected paraffin as a demonstrative sample to verify the routine femtogram-level chemical analysis using the AFM and vibrational spectroscopies. The same methodology can be applied to other materials. For example, polystyrene has been sampled, weighed, and analyzed following the same procedure as the paraffin case. Figure S-1 shows polystyrene mounted on the cantilever, the mass of which is estimated to be 88 ± 4 fg, along with its IR spectrum image obtained with a Varian 7000 FT-IR/600 UMA microspectrometer. The IR spectrum of polystyrene on the probe has characteristic peaks of polystyrene. The peak height at 1450 cm^{-1} extracted from the IR spectrum and is shown in Fig. S-1(b), indicating the location of polystyrene on the probe.

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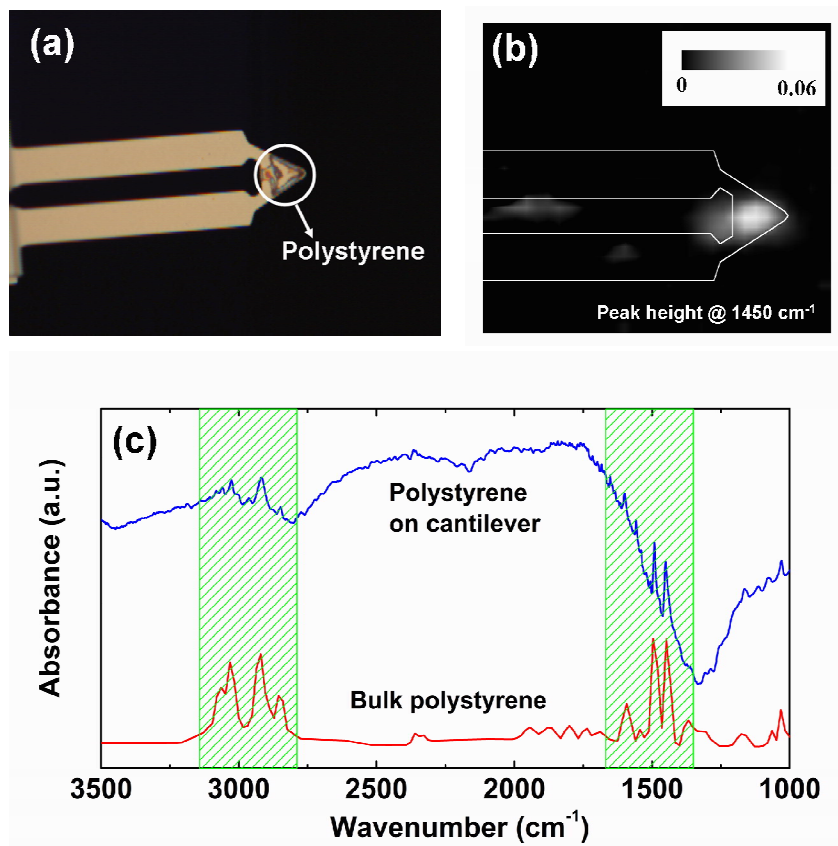


Figure S-1. *The experiment results of polystyrene:* (a) optical micrograph after sampling polystyrene on the probe. (b) the absorbance peak height image at 1450 cm⁻¹. (c) The IR spectrum of polystyrene on the probe clearly shows the presence of polystyrene by comparison of its IR spectrum with that of bulk polystyrene.