Electronic Supplementary Material (ESI) for Soft Matter.

Supporting Information

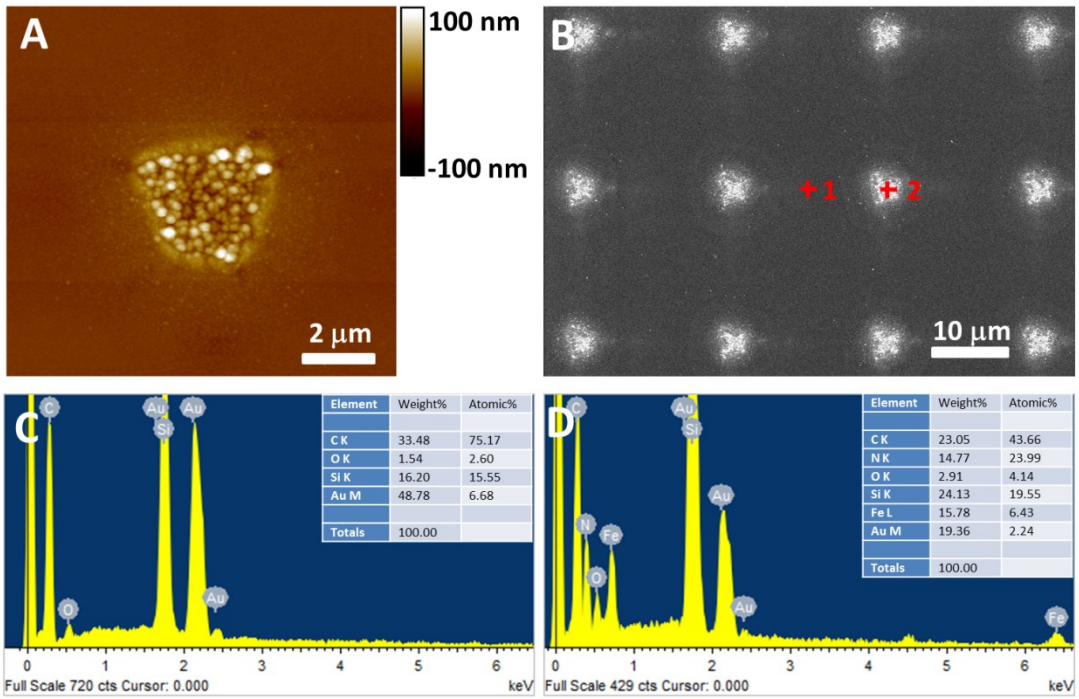

Figure S1. a) Typical atomic force microscopy (AFM) image of PB electrodeposited on the Au exposed area. The sizes of the PB particles vary from 50 nm to 100 nm. b) Scanning electron microscopy (SEM) image of the as-deposited PB arrays on the patterned Au electrodes with a 20 µm spacing. (C-D) Energy-dispersive X-ray (EDX) spectroscopy profiles of the background polymer layer (C, darker areas in B, spot 1) and the patterned areas (D, brighter areas in B, spot 2), respectively, showing the selective electrodeposition of PB.

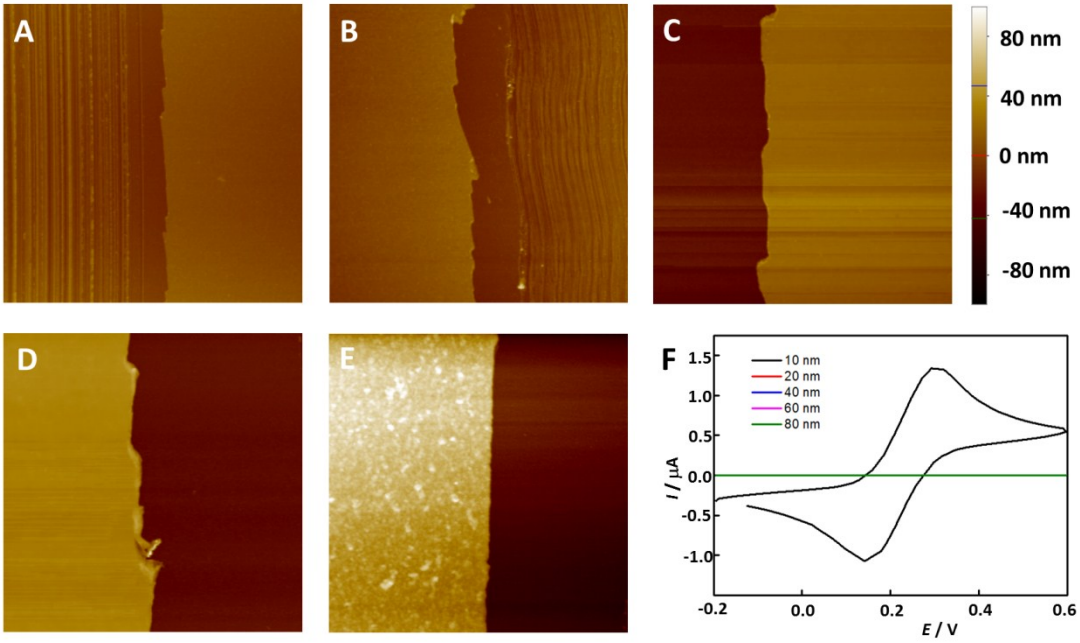

Figure S2. a-e) Typical atomic force microscopy (AFM) images of PMMA brush films at 10 nm to 80 nm thickness respectively, and their CV curves (f) when working as macroelectrode. Since there is no current in the CV process for those samples over 20 nm, the lines coincide and appear as one. The scan areas of AFM images are 20 μm x 20 μm.

In order to determine the optimum thickness of the PMMA layer, we grew PMMA brush film of 10 nm, 20 nm, 40 nm, 60 nm and 80 nm in our previous experiments and the AFM images are shown in Fig. S2a-e. We also examined the electrochemical response towards $Fe(CN)_6^{3-}/Fe(CN)_6^{4-}$: the samples over 20 nm in thickness exhibited good insulation (i.e., there is no current in the CV process), whereas there existed electric leakage for electrochemical measurements (i.e., the electrode behaved as a

macroelectrode) in samples under 20 nm (Fig. S2f). Besides, the uniformity of the film decreases when the thickness of the brush film is over 60 nm (Fig. S2e).