

Supplementary Information

Coupling the Chemistry and Topography of Block Copolymer Films Patterned by Soft Lithography for Nanoparticle Organization

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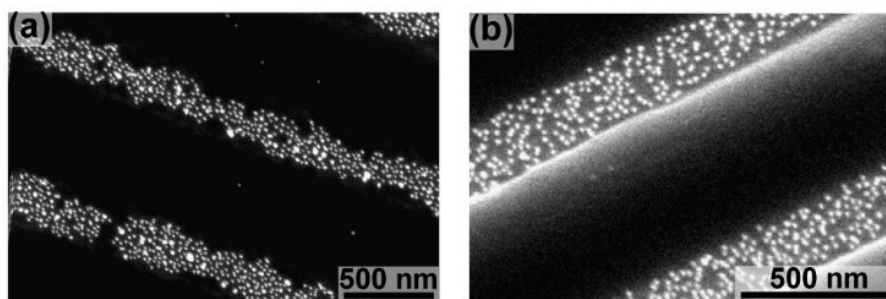


Fig. S1 Top-down (a) and tilted (b) SEM images of a PS film that was patterned by soft lithography, dipped into gold NP solution and was let to dry without rinsing.

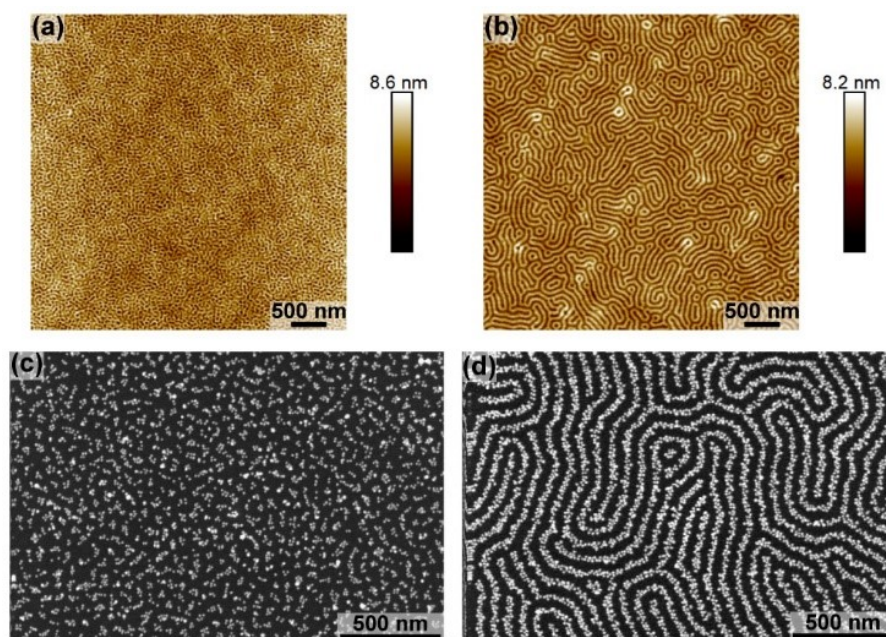


Fig. S2 (a,b) AFM height images of the BCP samples before (a) and after (b) annealing with chloroform vapor. (c,d) SEM images of un-annealed (c) and chloroform-annealed (d) films after reaction with DIB and decoration with citrate-stabilized gold NPs. NP density: 1500 ± 20 NP μm^{-2} (c); 2500 ± 20 NP μm^{-2} (d).

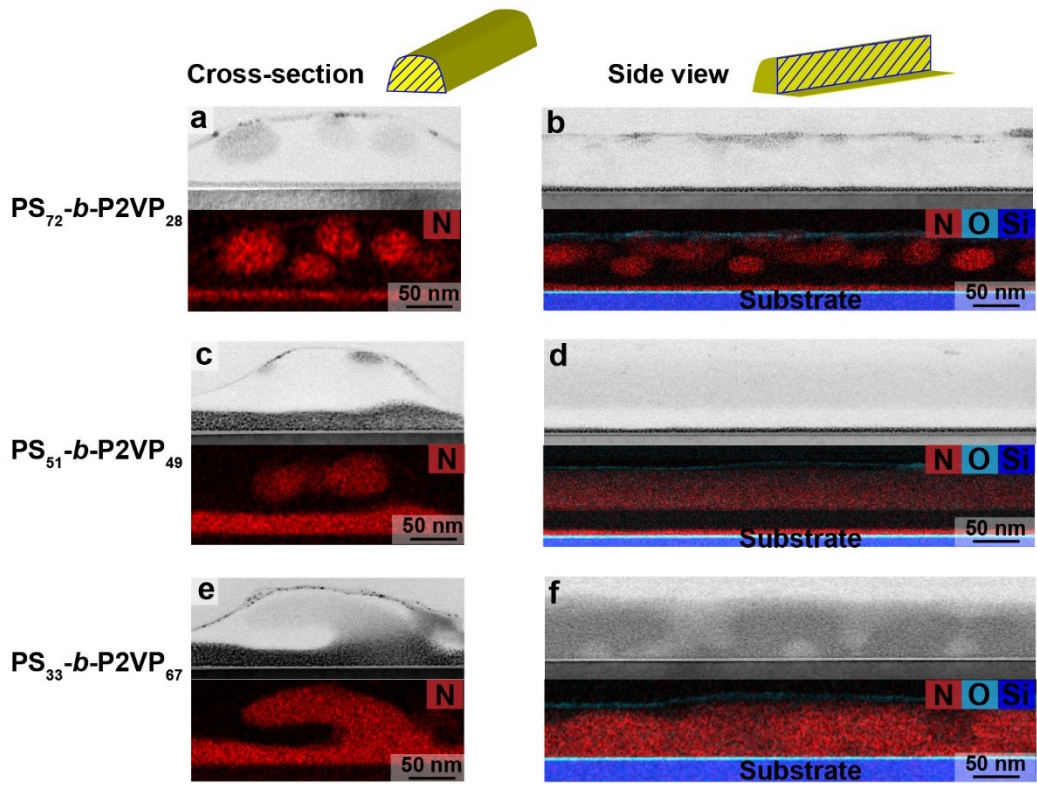


Fig. S3. Bright field TEM images (grayscale) and corresponding EDX maps (false coloured) of a ridge of patterned BCP films with different compositions imaged face-on using slices made perpendicular to the ridge axis (a,c,e) and viewed from the side using slices made parallel to the ridge axis and perpendicular to the substrate (b,d,f). The EDX maps shown in (b,d,f) are overlays of nitrogen (red), oxygen (light blue) and silicon (blue) maps. Note the spheroidal P2VP domains in the EDX images of $PS_{72}\text{-}b\text{-}P2VP_{28}$ (a,b), which appear squeezed in the direction normal to the substrate; the layer-like structure in the EDX images of $PS_{51}\text{-}b\text{-}P2VP_{49}$ (c,d), where a P2VP layer is located on top of a PS layer; and the isolated PS domains in the TEM image of $PS_{33}\text{-}b\text{-}P2VP_{67}$ (f), which are embedded in P2VP matrix.

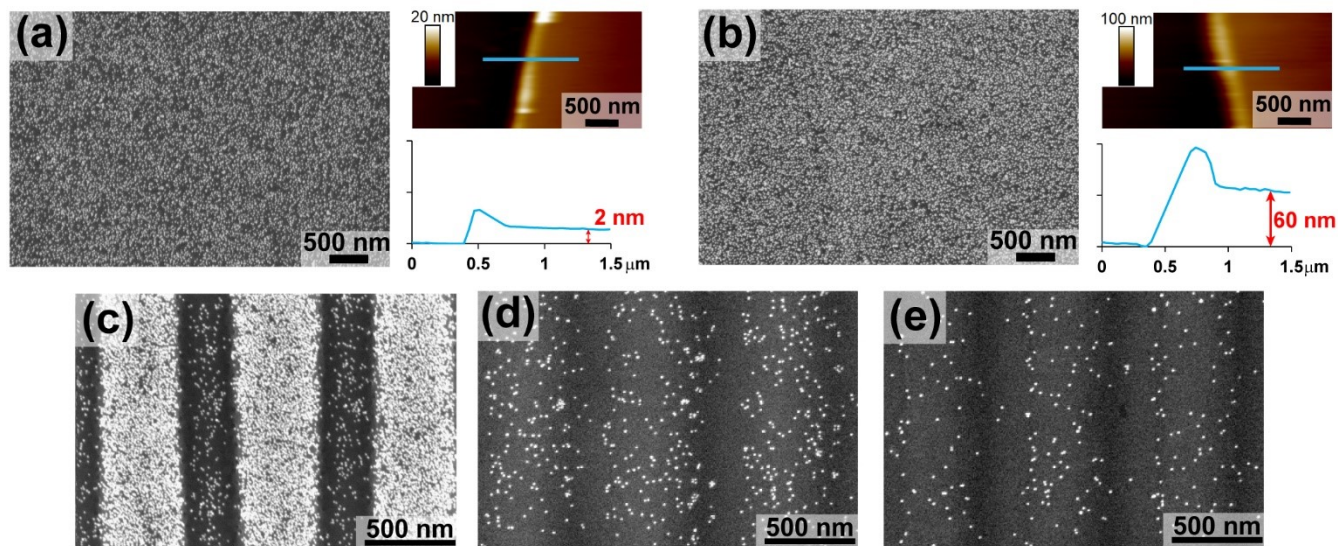


Fig. S4 (a,b) SEM images of NPs deposited on 2 nm-thick (a) and 60 nm-thick (b) crosslinked P2VP films, simulating the local film thicknesses in the valleys and ridges, respectively. No influence of film thickness on adsorbed NP density is observed. The AFM images and corresponding height profiles on the right of the SEM images show height scans taken near a scratch made in the film after casting, from which the film thickness was determined. (c-e) NP deposited on CFL-patterned, crosslinked P2VP films that were cast at different nominal thicknesses: (c) 30 nm (also shown in Fig. 2a); 60 nm (d); 90 nm (e). The patterned films in (d,e) adsorbed considerably less amount of NPs compared to the patterned film in (c), which is in accord with the fact that the entire film area was in contact with the stamp in these films.

Moreover, the valleys in (e) adsorbed a low amount of NPs although their local film thickness is 30 nm in this sample, which provides another indication that the local film thickness has no effect on the ability to adsorb NPs.