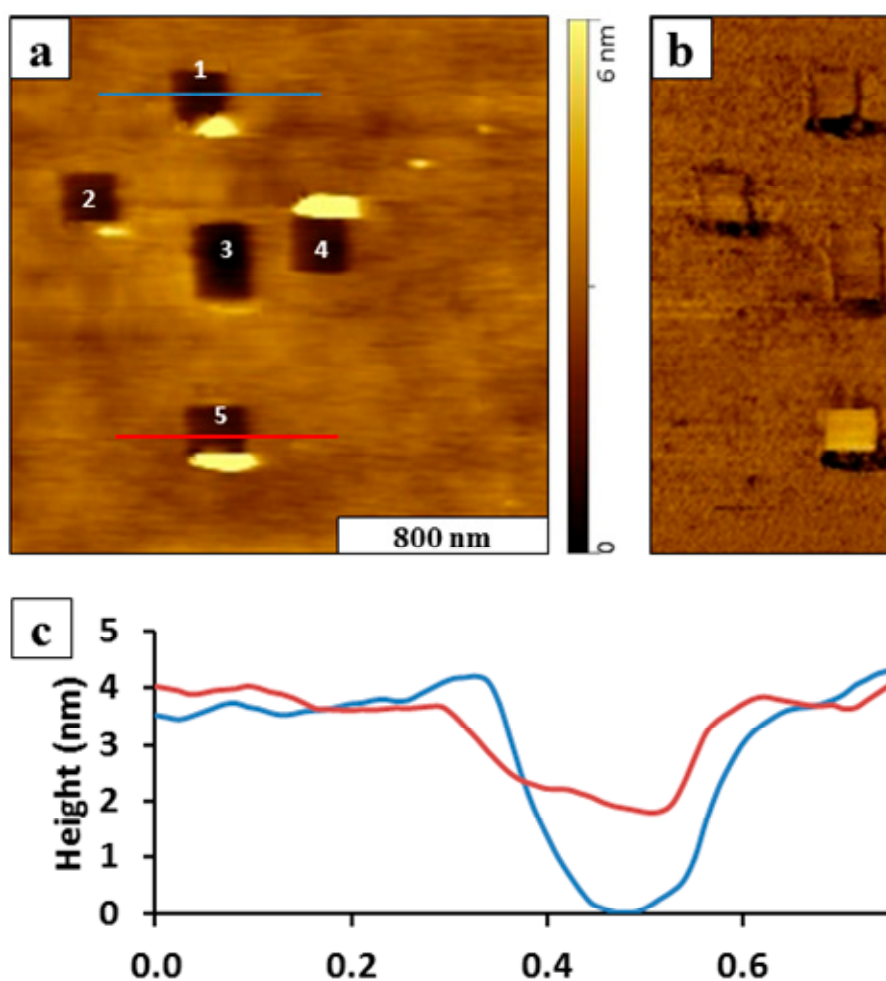


## Supporting Materials

**Figure S1.** Nanopatterns fabricated by scanning probe based nanolithography within a bilayer of 16-[3,5-bis(mercaptomethyl)phenoxy]hexadecanoic acid (BMPHA). (a) Side-by-side views of nanoshaved and nanografted patterns. These figures present a zoom-out view of Figure 5. (a) Contact-mode topography image acquired in ethanol. The areas 1, 2 and 3 are nanoshaved regions; areas 4 and 5 are nanografted patterns of n-octadecanethiol (ODT). (b) Simultaneously acquired lateral force image; (c) cursor profiles corresponding to the red and blue lines in a. The blue line reveals depth of the nanoshaved area, the red line profiles the depth of nanografted pattern. The bilayer of BMPHA was prepared by immersion of a Au(111) substrate in 5 mM ethanolic BMPHA solution for 30 h. The concentration of ethanolic ODT solution used for nanografting was 1 mM.



**Figure S2.** Steps for preparing nanopatterns of thiol-based films using immersion particle lithography. **(a)** A surface mask of close-packed mesospheres was prepared on template-stripped gold, and annealed for 12 h at 150 °C. **(b)** The masked substrate was immersed in an ethanolic solution of dilute multidentate thiol. **(c)** The mask of silica spheres was removed by rinsing and sonication. The uncovered pore areas can be filled with a second molecule, such as n-alkanethiols with a further immersion step.

