SUPPORTING INFORMATION

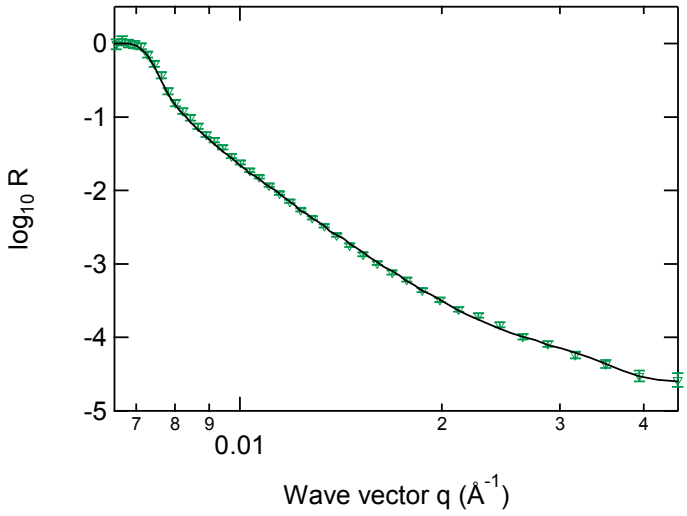
Synthesis of PAA brushes

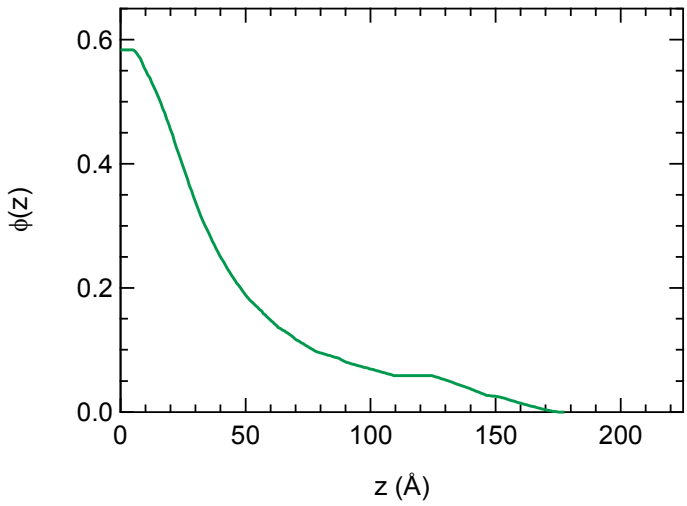
After being cleaned and rejuvenated in a piranha solution (70 vol% of sulfuric acid (97%) and 30 vol% of hydrogen peroxide (35%) heated at 150°C for 20 min), the silicon mono-crystals are extensively rinsed with Milli-Q water and dried under a nitrogen flux. They are immediately placed in a reactor under nitrogen atmosphere and immersed in a 2 vol% solution of 3-glycidoxypropyl-trimethoxysilane (Gelest, 97 %) in extra-dry toluene (Aldrich, 99.8 %) for 5 hours at room temperature. The silicon substrate are then rinsed with toluene and dried under a nitrogen flux.

A 1 wt% solution of carboxy-terminated poly(*tert*-butylacrylate) P^{t}BuA long chains (M_n = 42 kg/mol, PDI = 1.12, Polymer Source) in tetrahydrofuran (THF) is deposited on the epoxy-modified silicon crystal and a polymeric film is formed by solvent evaporation. The substrate topped with the P^{t}BuA reservoir is heated at 120°C under vacuum during 24 hours. The substrate is thoroughly rinsed in THF. A second 1 wt% solution of P^{t}BuA short chains (Mn = 4.2 kg/mol, PDI = 1.25, Polymer Source) in THF is then deposited on the substrate to form another reservoir of polymer. After being heated during 48 hours at 120°C under vacuum, the silicon crystal is rinsed again, dried, and the sample is pyrolyzed at 200°C under vacuum during 2 hours. Finally, it is immersed overnight in Milli-Q water equilibrated at pH 2.

Neutron reflectivity curve and corresponding volume fraction profile

The neutron reflectivity curve is displayed in the whole range of wave vector. Also is shown the corresponding volume fraction profile that best fit the reflectivity curve. The reflectivity curve is obtained from experiment B - HMDZ. The PDMA hydrogel is compressed on the silicon substrate functionalized by a poly(acrylic acid) brush with these characteristics: γ = 33 Å, σ = 0.0735 nm^{-2} at pH 2.


0
-1
-2
-3
-4
-5
log10 R
7
8
9
0.01
2
3
4
Wave vector q (Å-1)


0.6
0.4
0.2
0.0
ϕ(z)
0
50
100
150
200
z (Å)