

POSS-tethered fluorinated diblock copolymers with linear- and star-shaped topologies: Synthesis, self-assembled film and hydrophobic application

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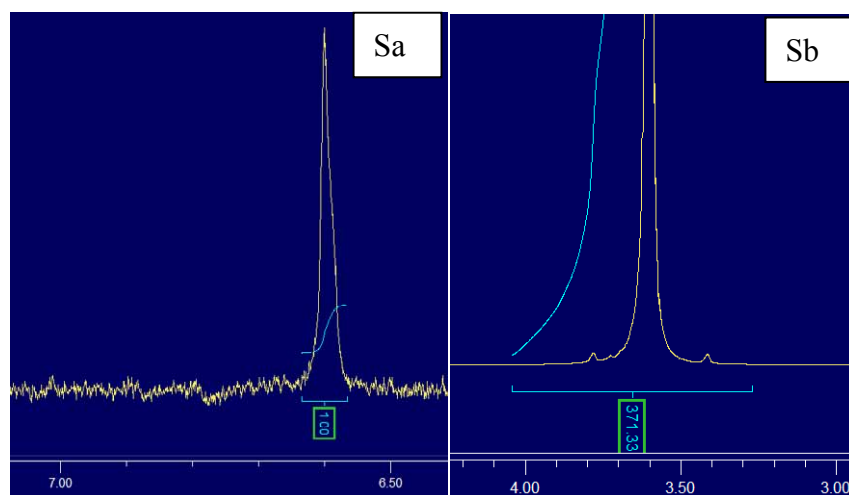
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Supporting Information

S1: The calculated molecular weights of ap-POSS-PMMA-b-PDFHM is as follows:

The typical δ_H (ppm) at 6.75 ppm (referred to as "Peak a") is $-\text{NHCO}-$ in ap-POSS; The typical δ_H (ppm) at 3.62 ppm (referred to as "Peak b") is $-\text{OCH}_3$ in PMMA; The typical δ_H (ppm) at 5.5 ppm (referred to as "Peak c") is $-\text{O}-\text{CH}_2-$ in PDFHM. The molecular weights of polymer ap-POSS-PMMA (Mn1) could be calculated by the formula: Sa, Sb and Sc mean the integrated area of Peak a, b and c. $M_{\text{ap-POSS}}$, M_{MMA} and M_{DFHM} mean the molecular weights of POSS, MMA and DFHM.

$$\text{Mn1} = \frac{\text{Sb}}{\frac{\text{Sb}}{3}} \times \text{Mn}(\text{MMA}) + \text{Mn}(\text{ap} - \text{POSS})$$



The molecular weight of ap-POSS-PMMA (Mn1) is calculated by the formula:

$$\text{Mn1} = \frac{371.33}{\frac{3}{1}} \times 100 + 1024.5 = 13402\text{g/mol}$$

Similarly, the molecular weight of ap-POSS-PMMA-PDFHM (Mn2) is calculated by the formula:

$$Mn2 = \frac{\frac{Sc}{2}}{SA} \times Mn(DFHM) + Mn1$$

Therefore:

$$Mn2 = \frac{\frac{39.42}{2}}{1} \times 400 + 13402 = 21286 \text{g/mol}$$

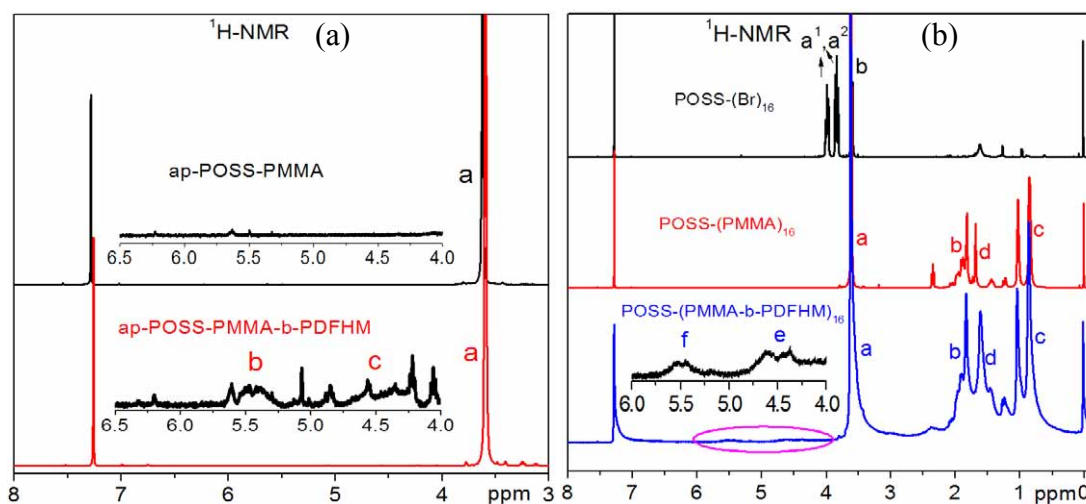
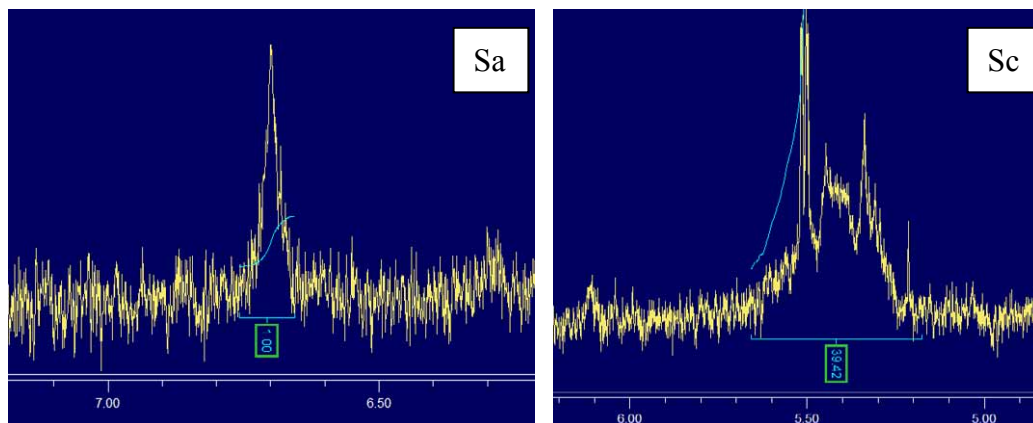


Fig. S1 ^1H -NMR spectra of s -POSS-(PMMA- b -PDFHM) $_{16}$ (a) and ap-POSS-PMMA- b -PDFHM (b)

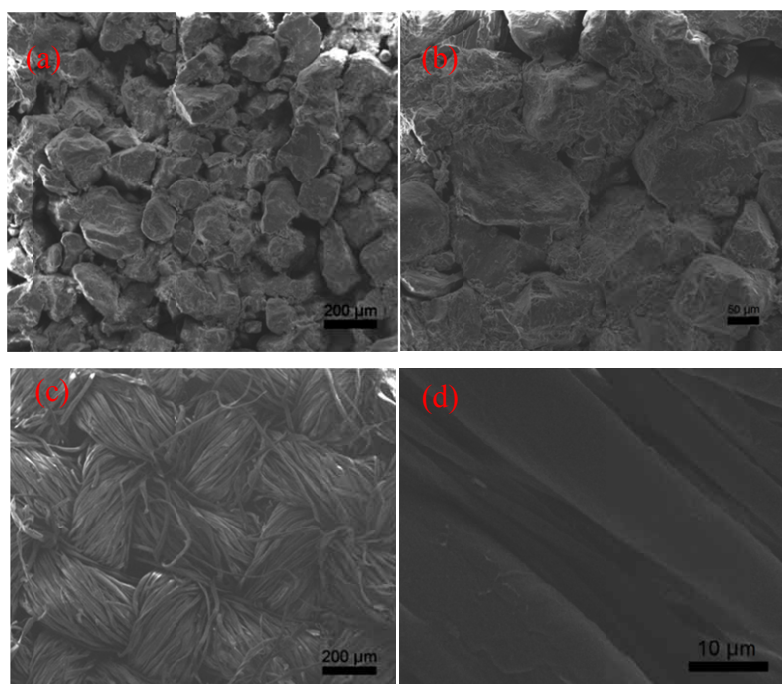


Fig.S2 SEM images of the uncoated sandstones and cotton fabric

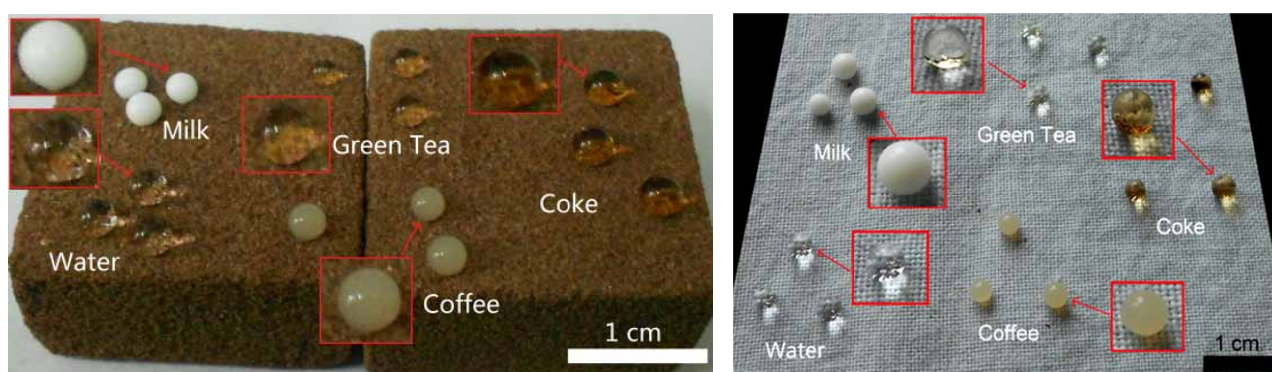


Fig. S3 The hydrophobic application of copolymer to the substrates of stones and cotton fabrics of water, coffee, milk, coke and green tea