Supplementary Information

Stable surface functionalization of carbonized mesoporous silicon

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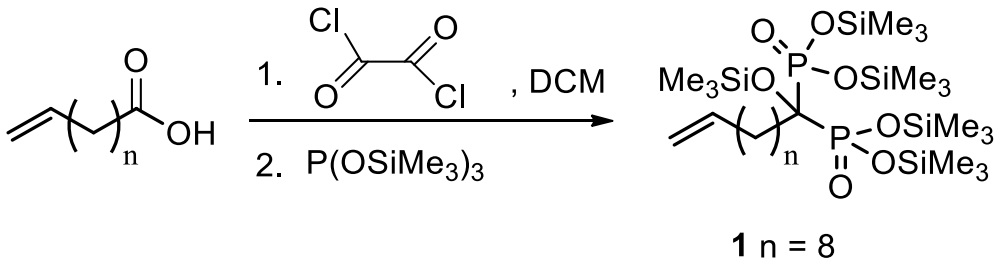

Figure S1. Synthesis scheme of the bisphosphonate molecule.

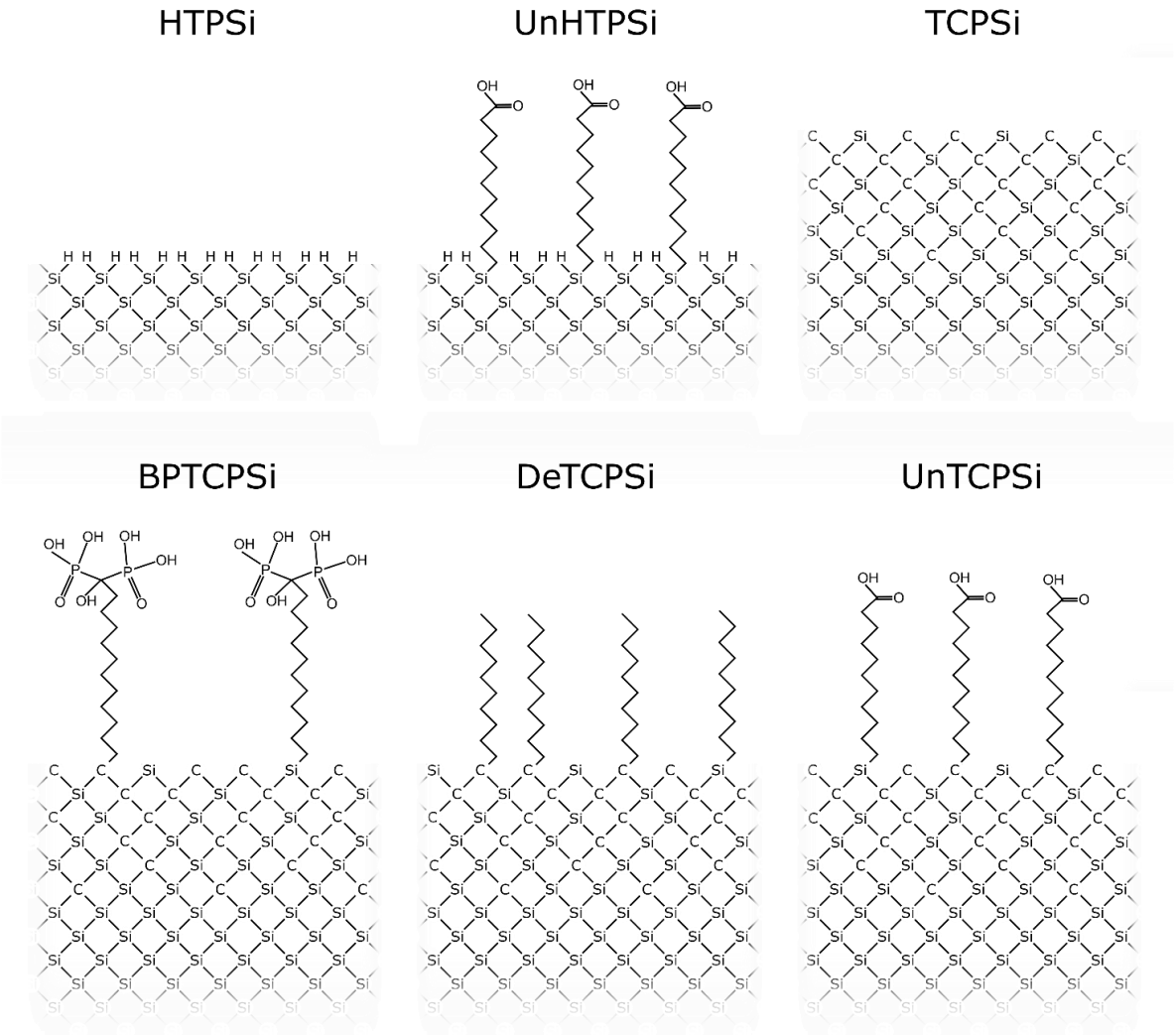

Figure S2. The structures of the surfaces of the materials produced in the present work. HTPSi consists of silicon framework with hydrogen termination on the surface. UnHTPSi is produced by grafting undecylenic acid on HTPSi by hydrosilylation. TCPSi consists of silicon framework with a carbon rich surface layer including silicon carbide silicon oxycarbide and graphitic carbon. BPTCPSi, DeTCPSi and Un TCPSi are produced by grafting bisphosphonates, decene and undecylic acid, respectively on the surface of TCPSi.

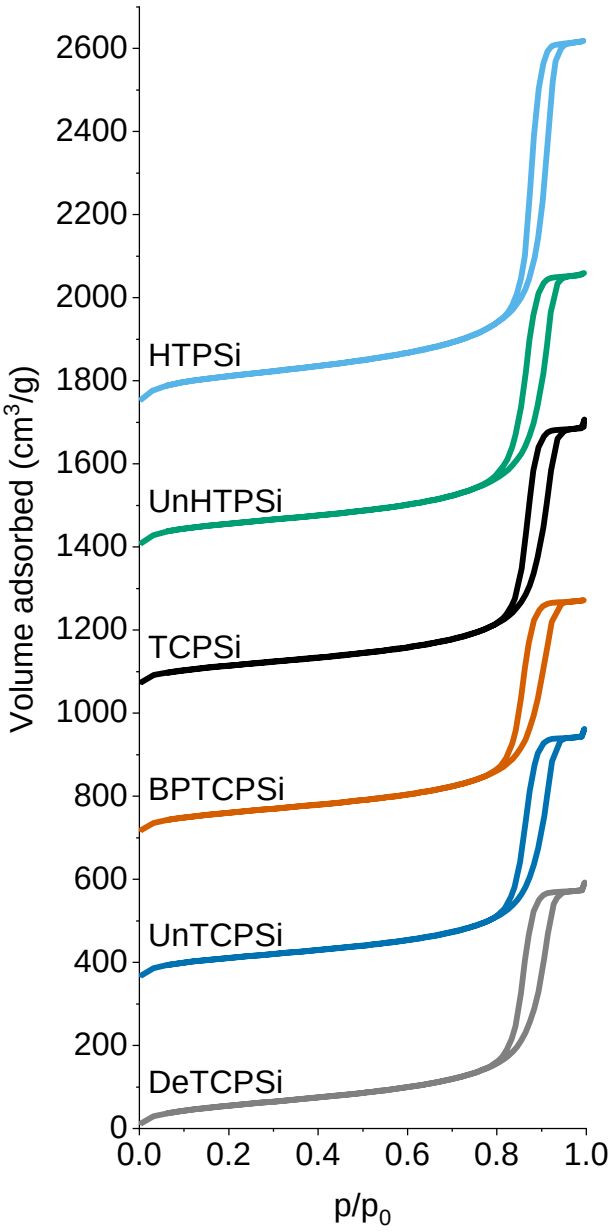

Figure S3. Nitrogen sorption isotherms.

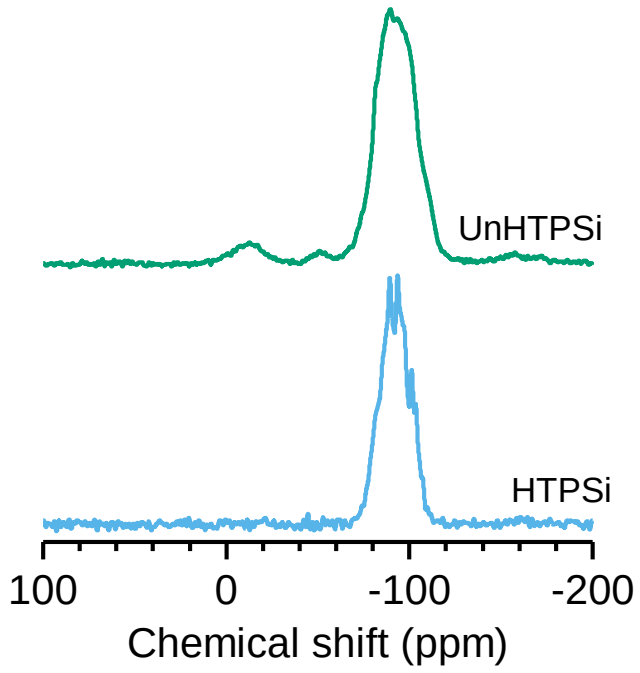

Figure S4. 1H-29Si CP-MAS NMR spectra of UnHTPSi and HTPSi.

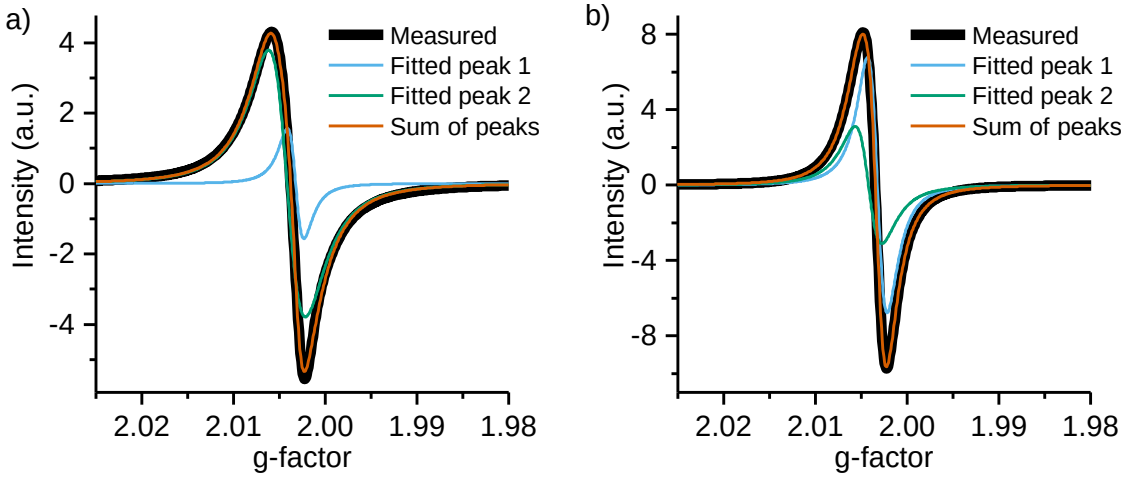

Figure S5. EPR spectrum of TCPSi kept under inert atmosphere a) before addition of undecylenic acid and b) after addition of undecylenic acid with fitted Lorentzian peaks.

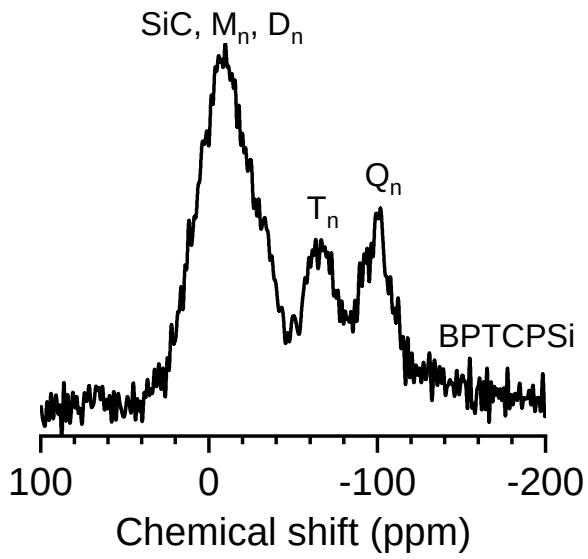

Figure S6. 29Si CP-MAS NMR spectra of BPTCPSi (Mm = Si(R,R',R'')(OH)1−m(OSi)m, (0 ≤ m ≤ 1); Dn = (R,R')-Si(OH)2−n(OSi)n, 0 ≤ n ≤ 2; Tn = R-Si(OH)3−n(OSi)n, 0 ≤ n ≤ 3; Qn = Si(OSi)n(OH)4−n, 0 ≤ n ≤ 4).

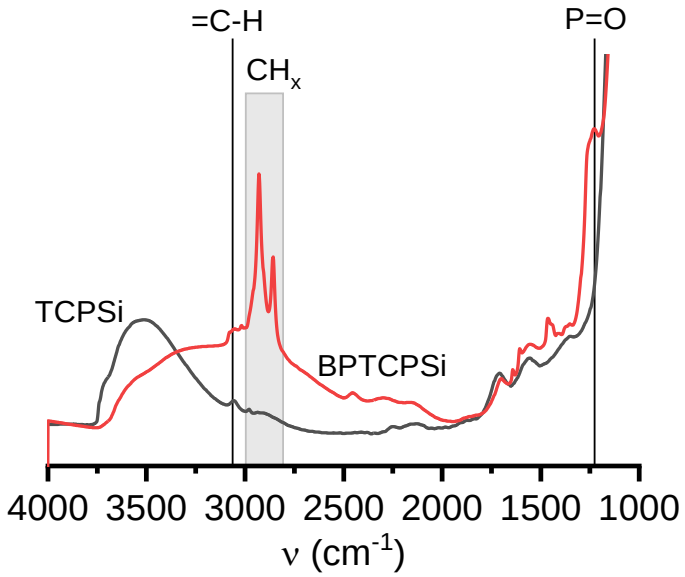

Figure S7. FTIR spectra of TCPSi and BPTCPSi. The stretch mode of P=O is observed at approximately 1250 cm-1 in the BPTCPSi spectrum.