

Supporting Information

Highly efficient antifouling coating of star-shaped block copolymers with variable sizes of hydrophobic cores and charge-neutral hydrophilic arms

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Supporting Information

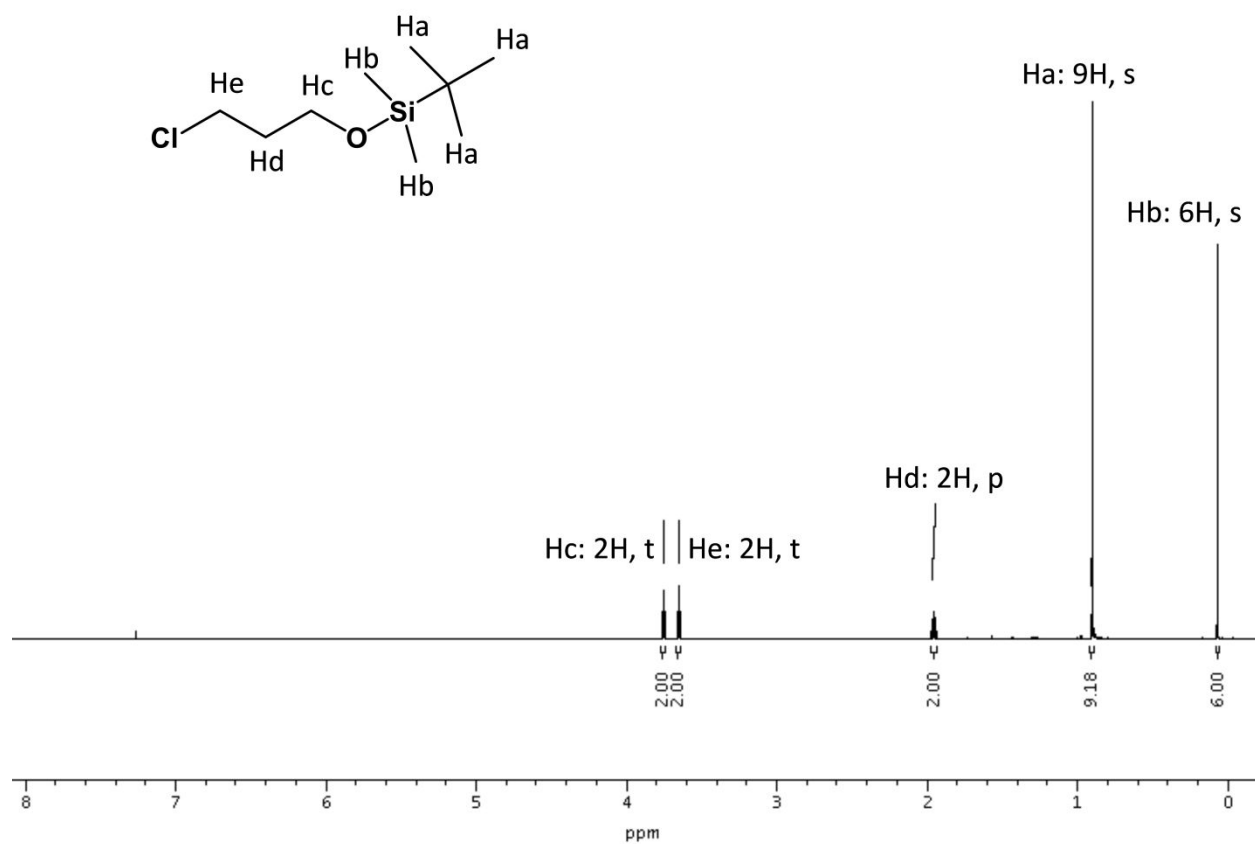


Figure S1. ^1H NMR spectrum of 1-(tert-butyl dimethylsilyloxy)-3-chloropropane.

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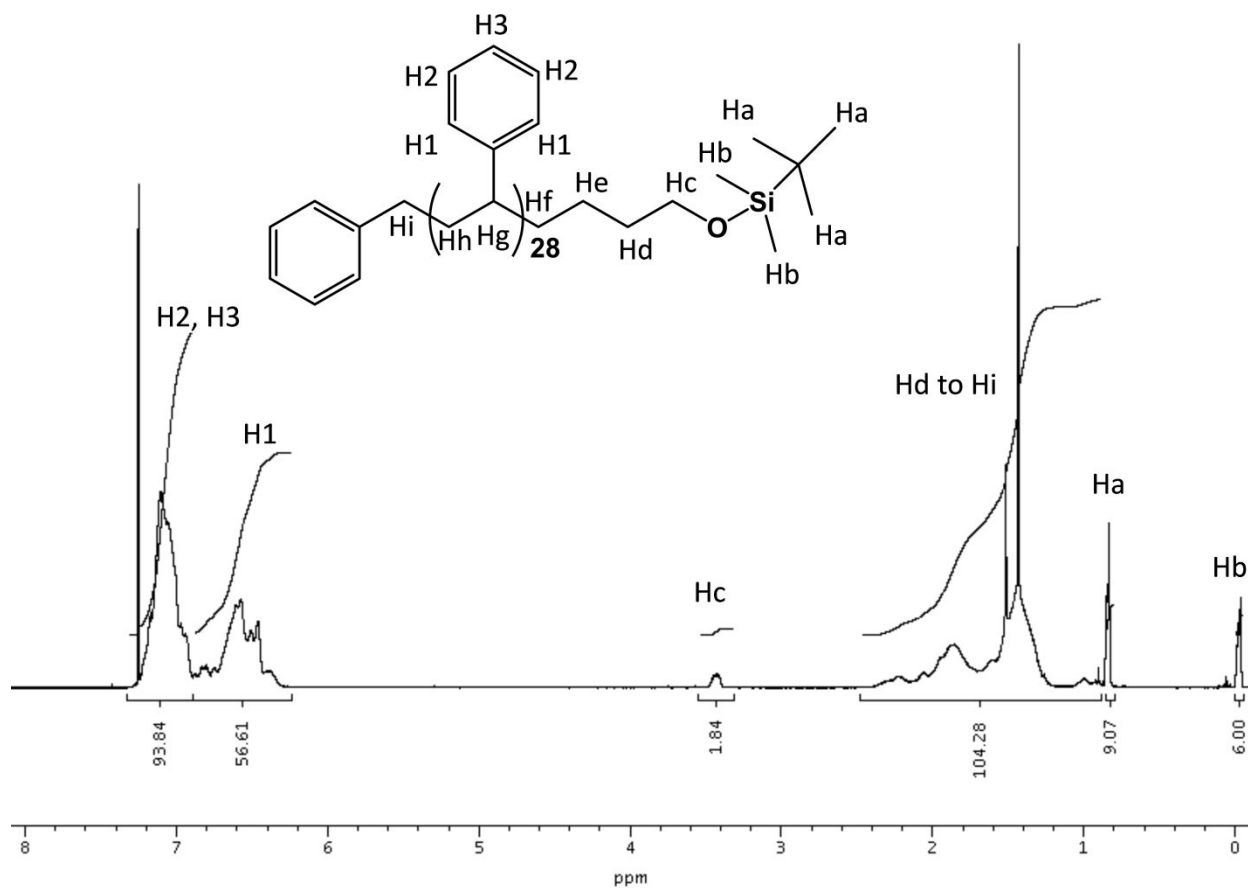


Figure S2. ¹H NMR spectrum of quenched linear polystyrene (PS) arm used in the fabrication of PSC 1.

Note: number of styrene repeating units was calculated by dividing the magnitude of the integral of H1 resonance intensity by 2 since each unit contains 2 of the H1 proton.

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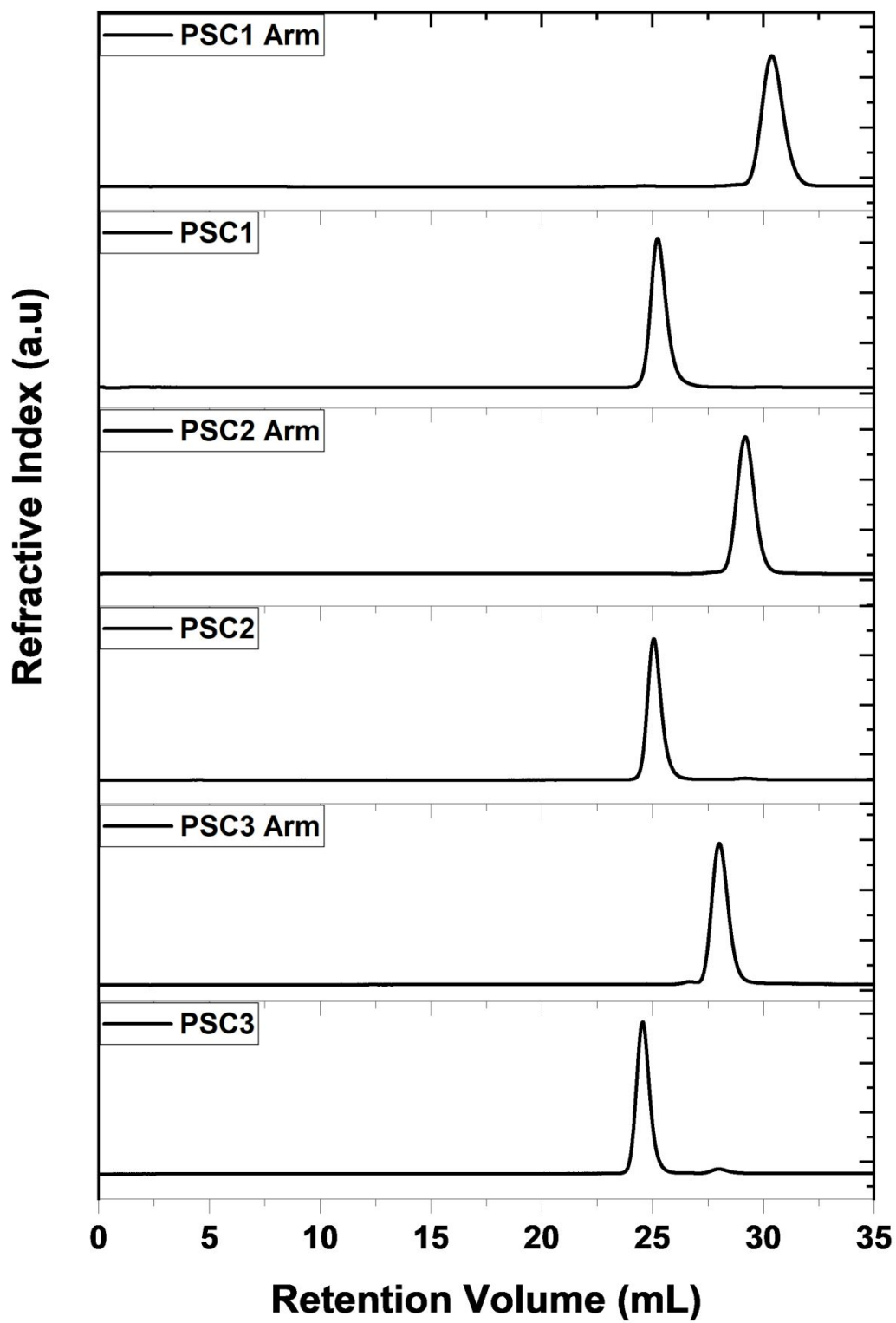


Figure S3. GPC plots of polystyrene cores (PSCs) and respective arms.

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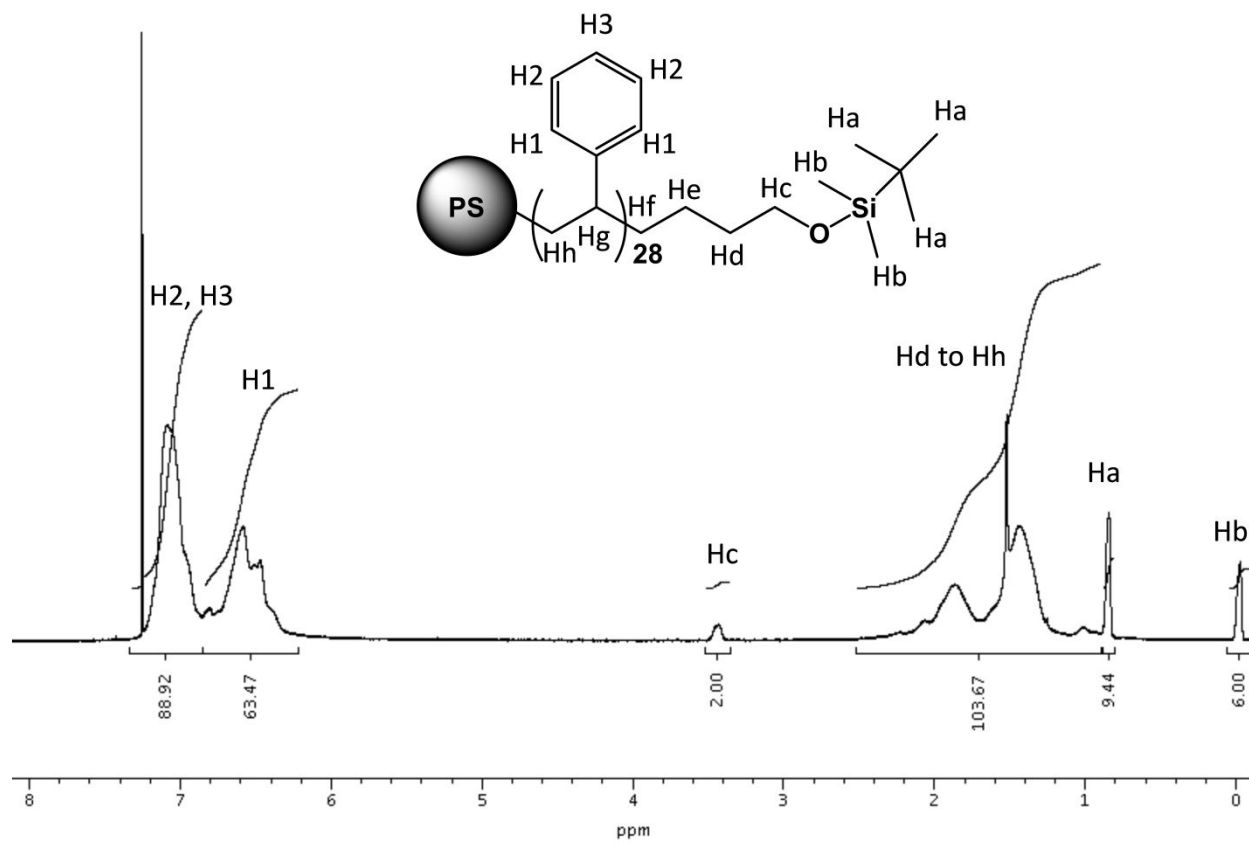


Figure S4. ¹H NMR spectrum of polystyrene core (PSC 1).

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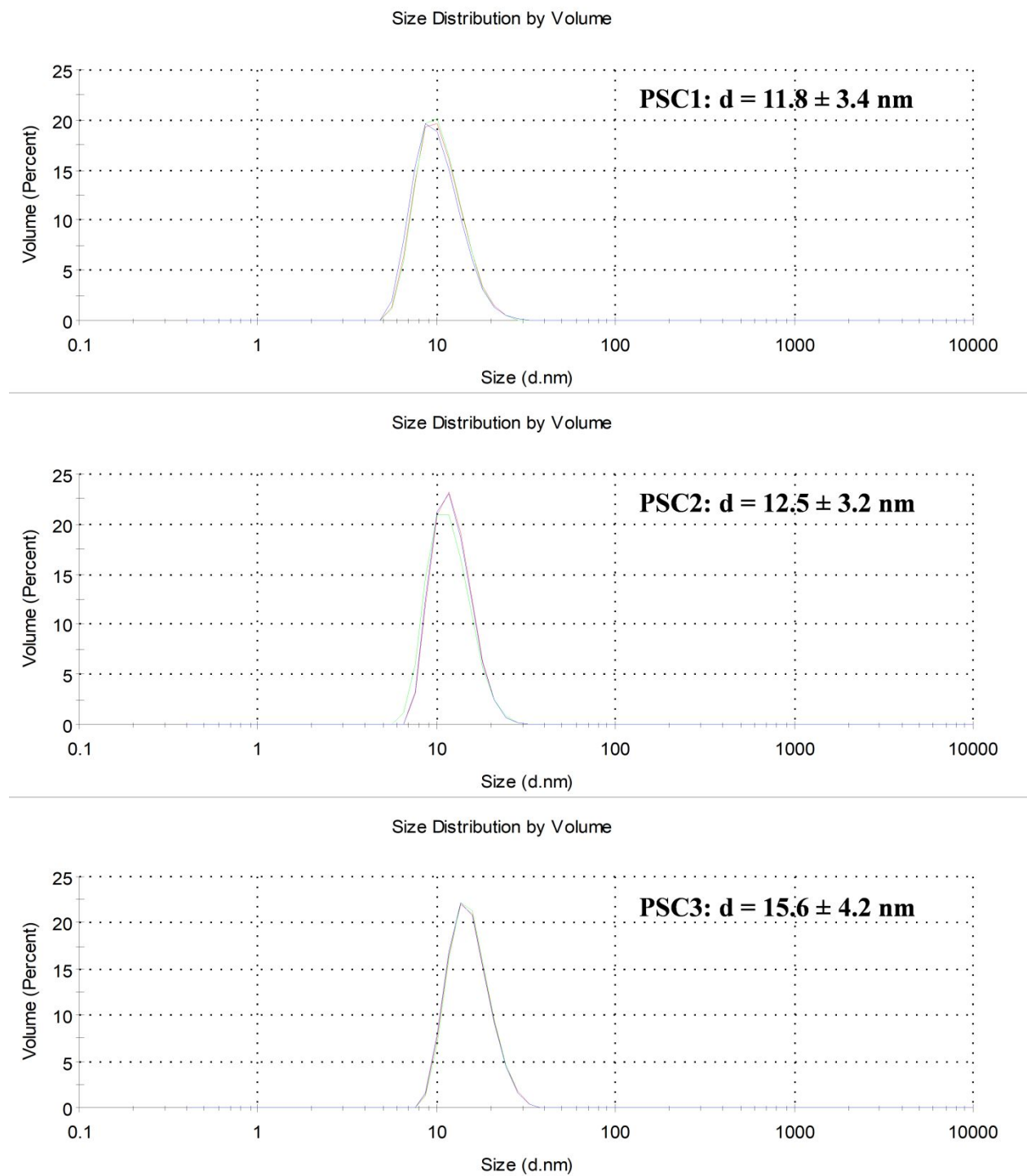


Figure S5. DLS plots of polystyrene cores (PSCs).

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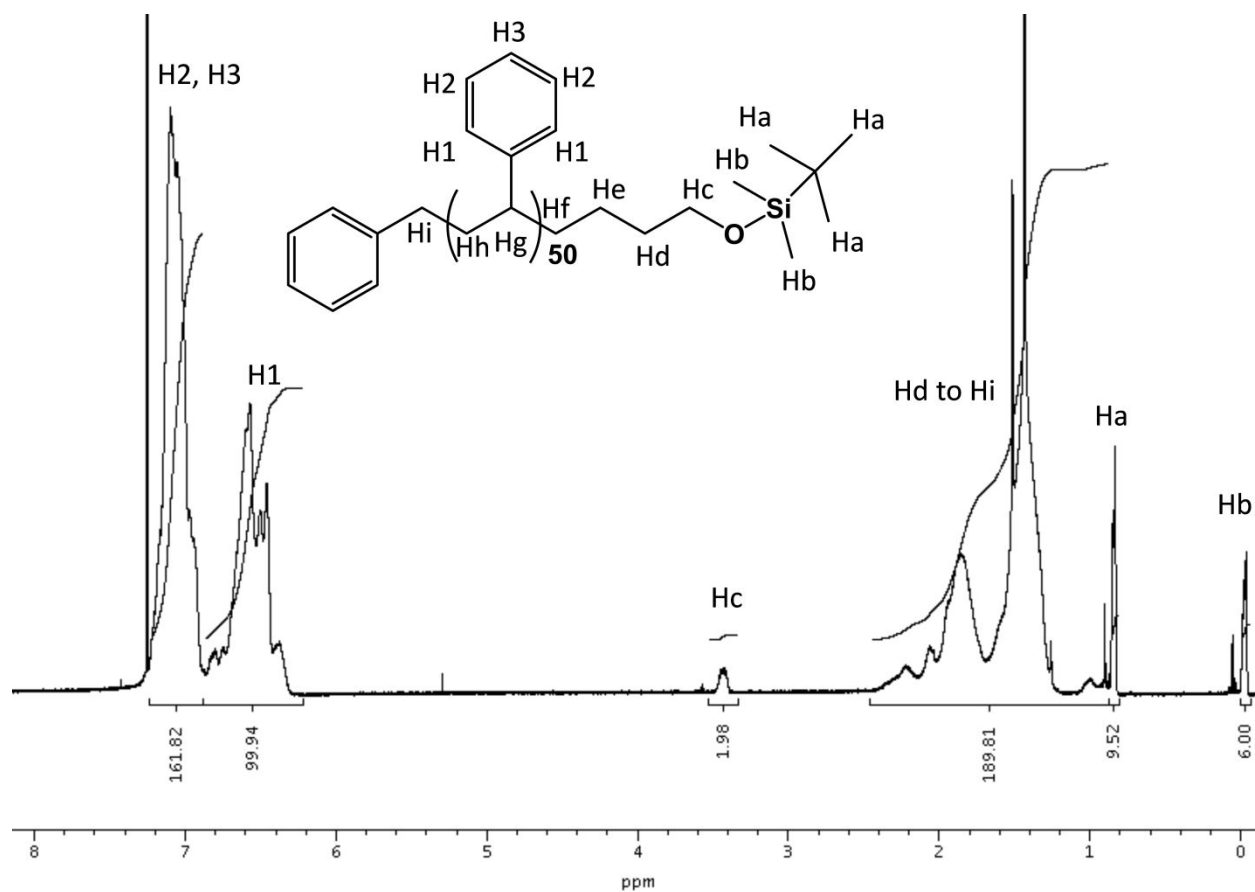


Figure S6. ¹H NMR spectrum of quenched linear polystyrene (PS) arm used in the fabrication of PSC 2.

Note: number of styrene repeating units was calculated by dividing the magnitude of the integral of H1 resonance intensity by 2 since each unit contains 2 of the H1 proton.

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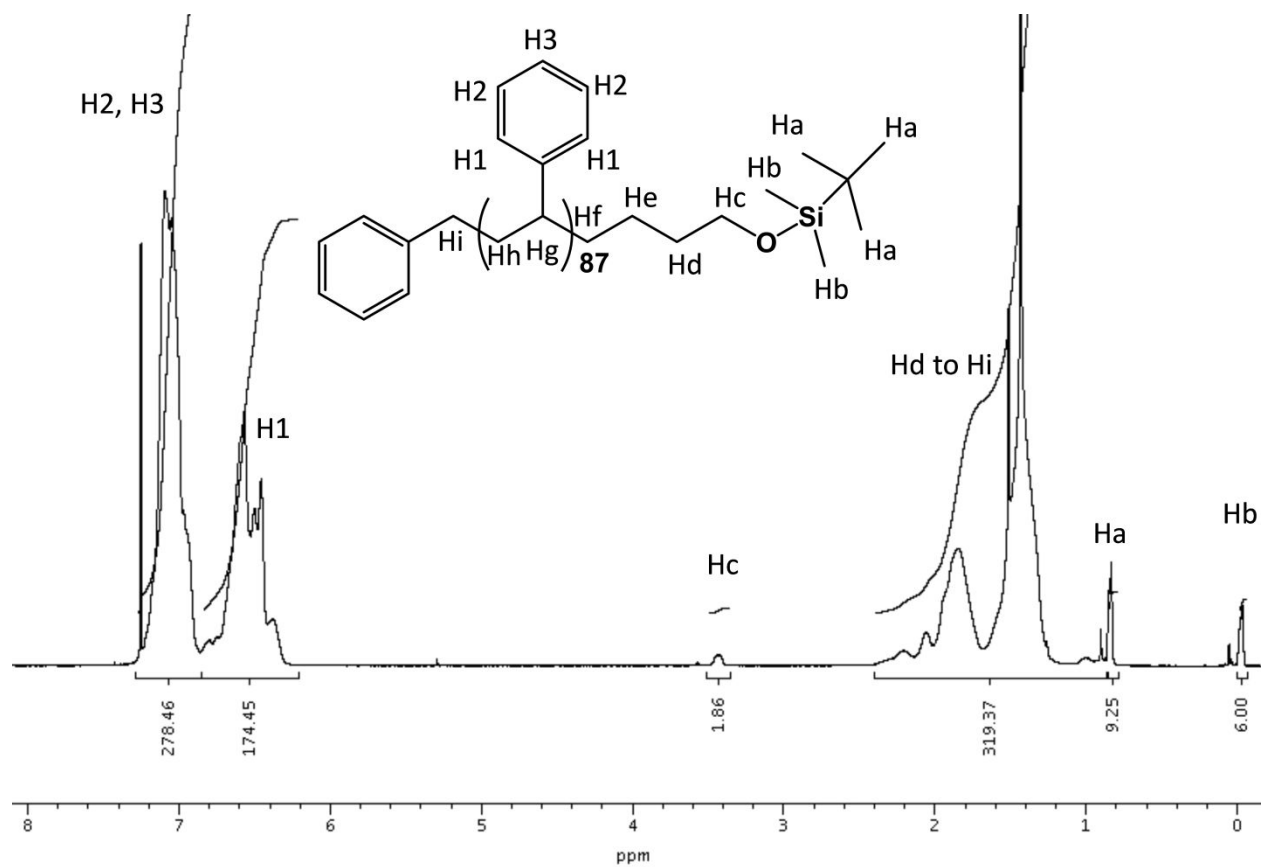


Figure S7. ¹H NMR spectrum of quenched linear polystyrene (PS) arm used in the fabrication of PSC 3. Note: number of styrene repeating units was calculated by dividing the magnitude of the integral of H1 resonance intensity by 2 since each unit contains 2 of the H1 proton.

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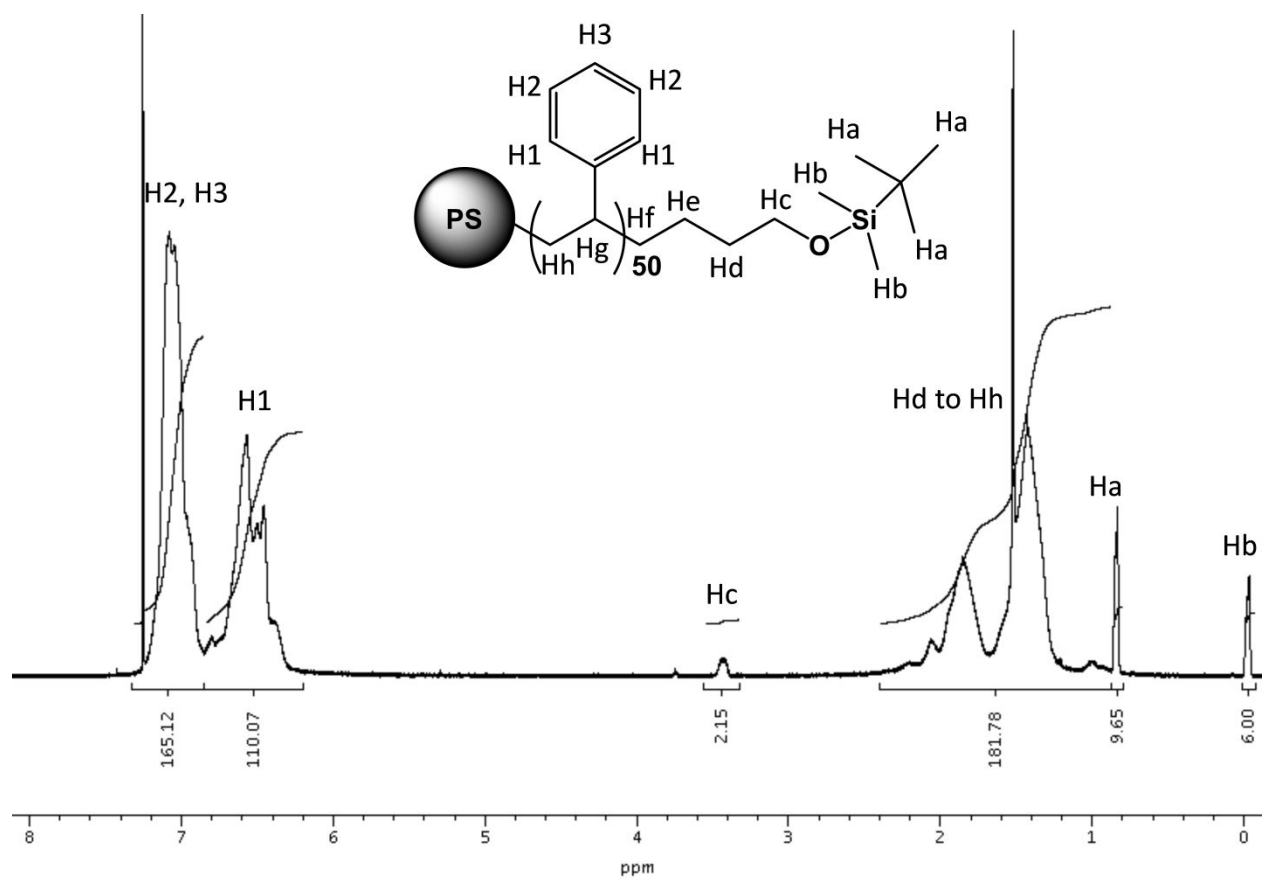


Figure S8. ¹H NMR spectrum of polystyrene core (PSC 2).

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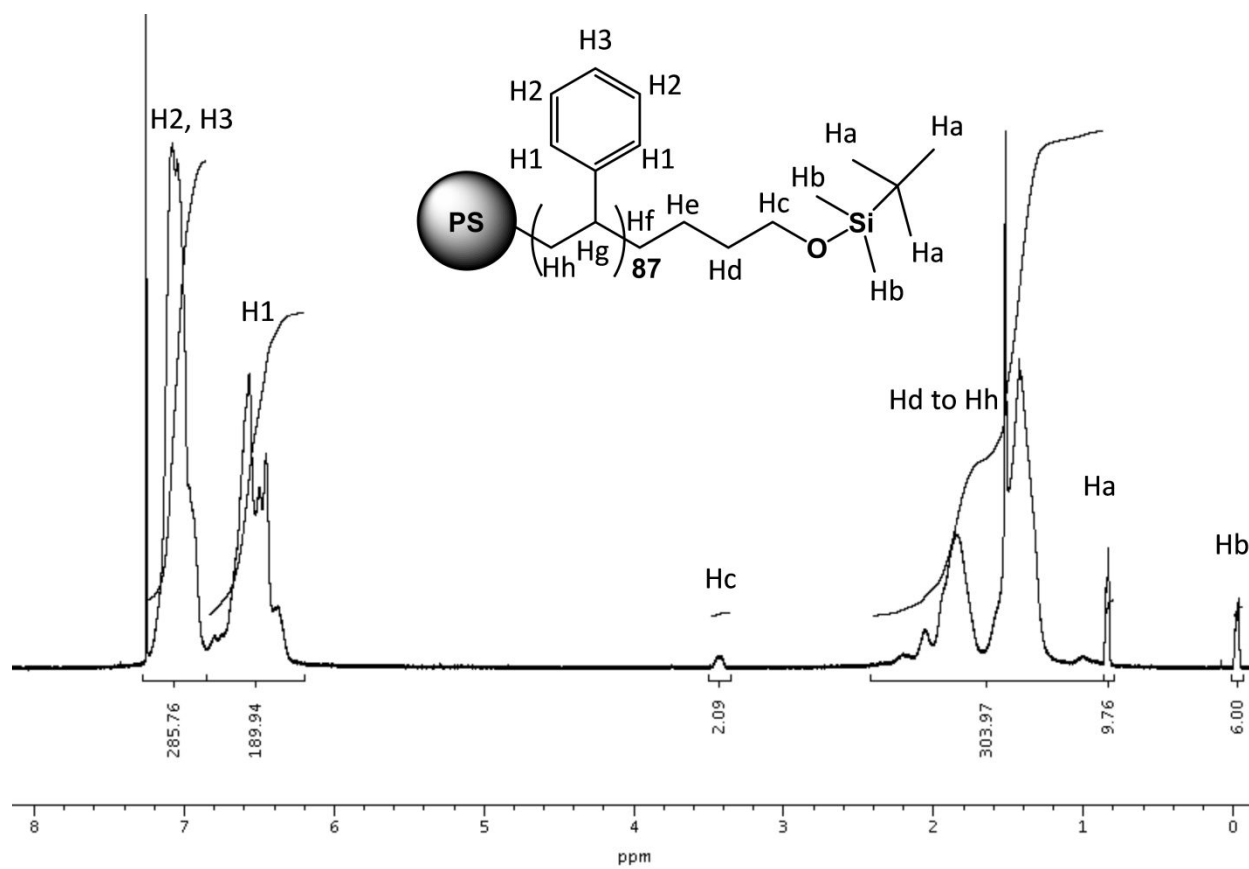


Figure S9. ¹H NMR spectrum of polystyrene core (PSC 3).

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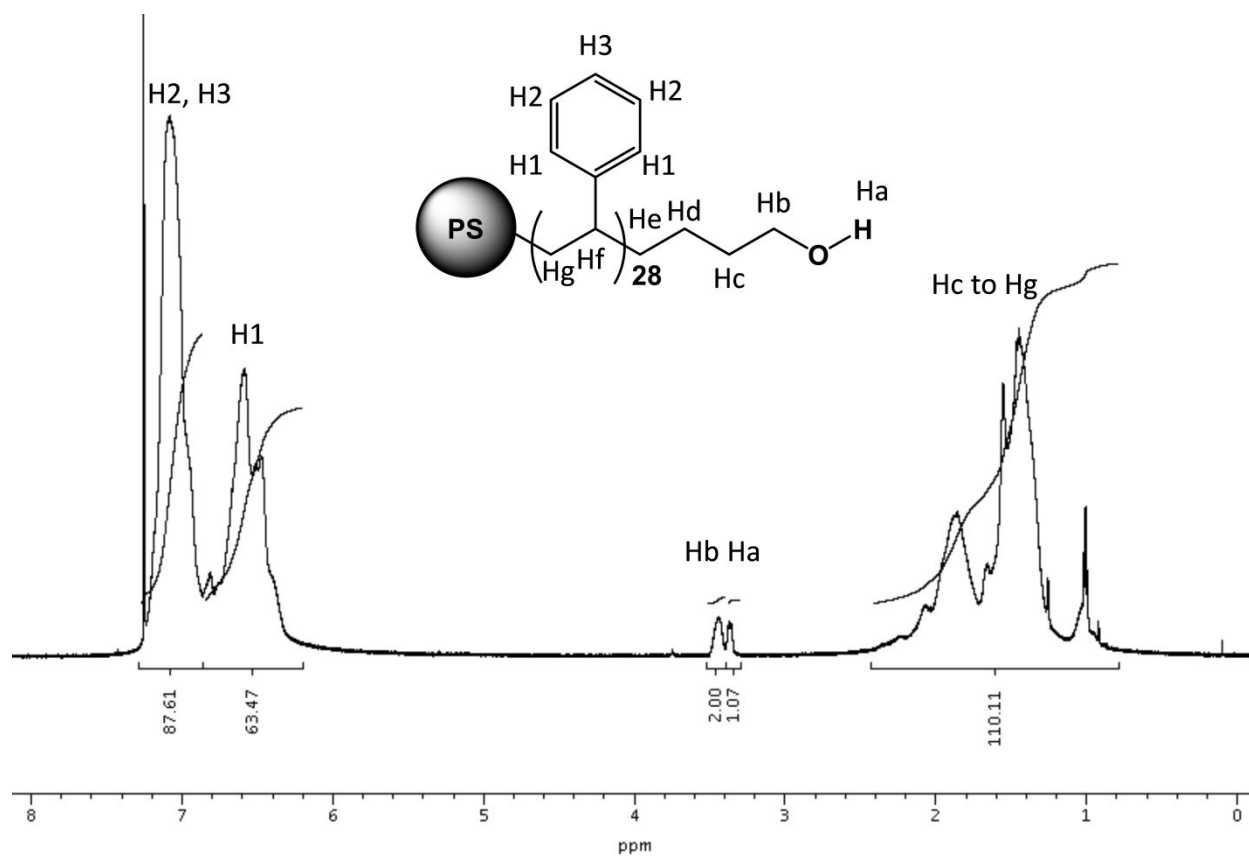


Figure S10. ^1H NMR spectrum of deprotected polystyrene core of PSC 1.

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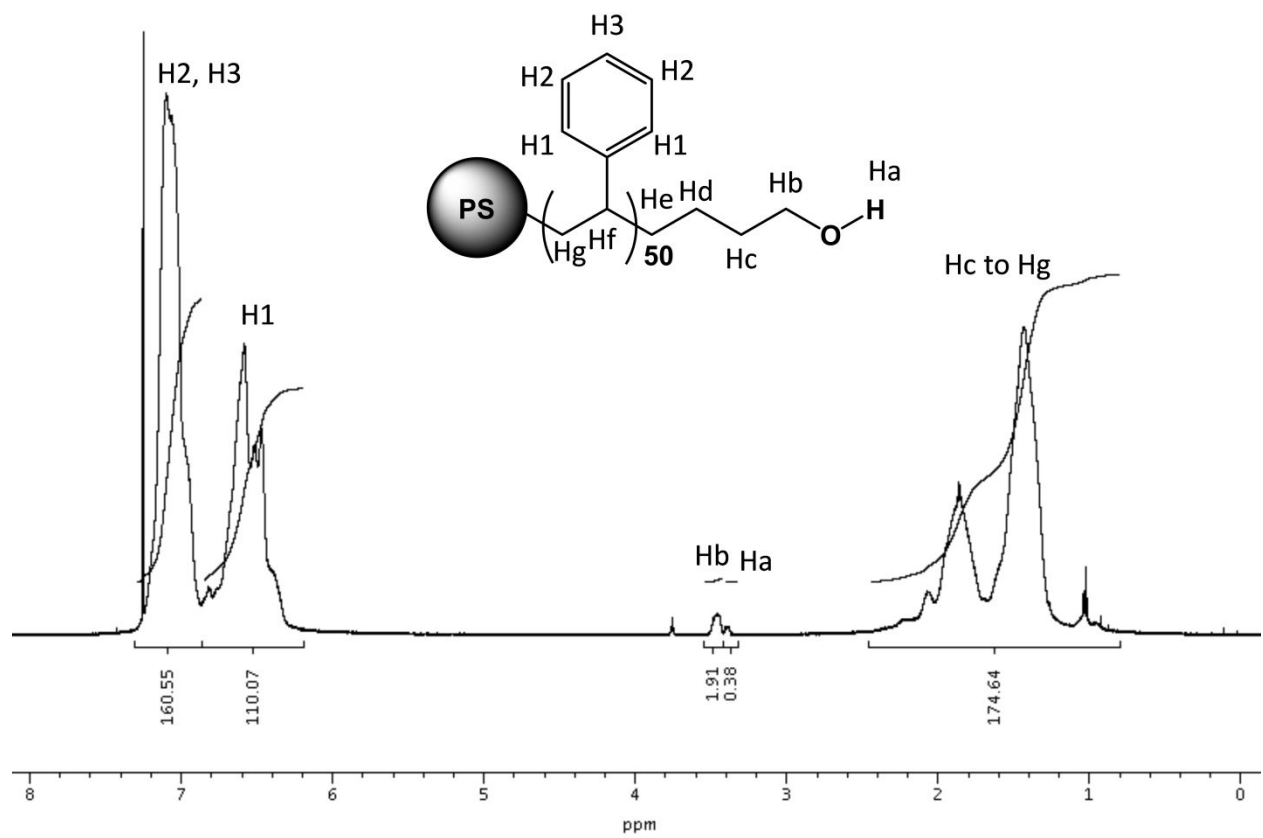


Figure S11. ^1H NMR spectrum of deprotected polystyrene core of PSC 2.

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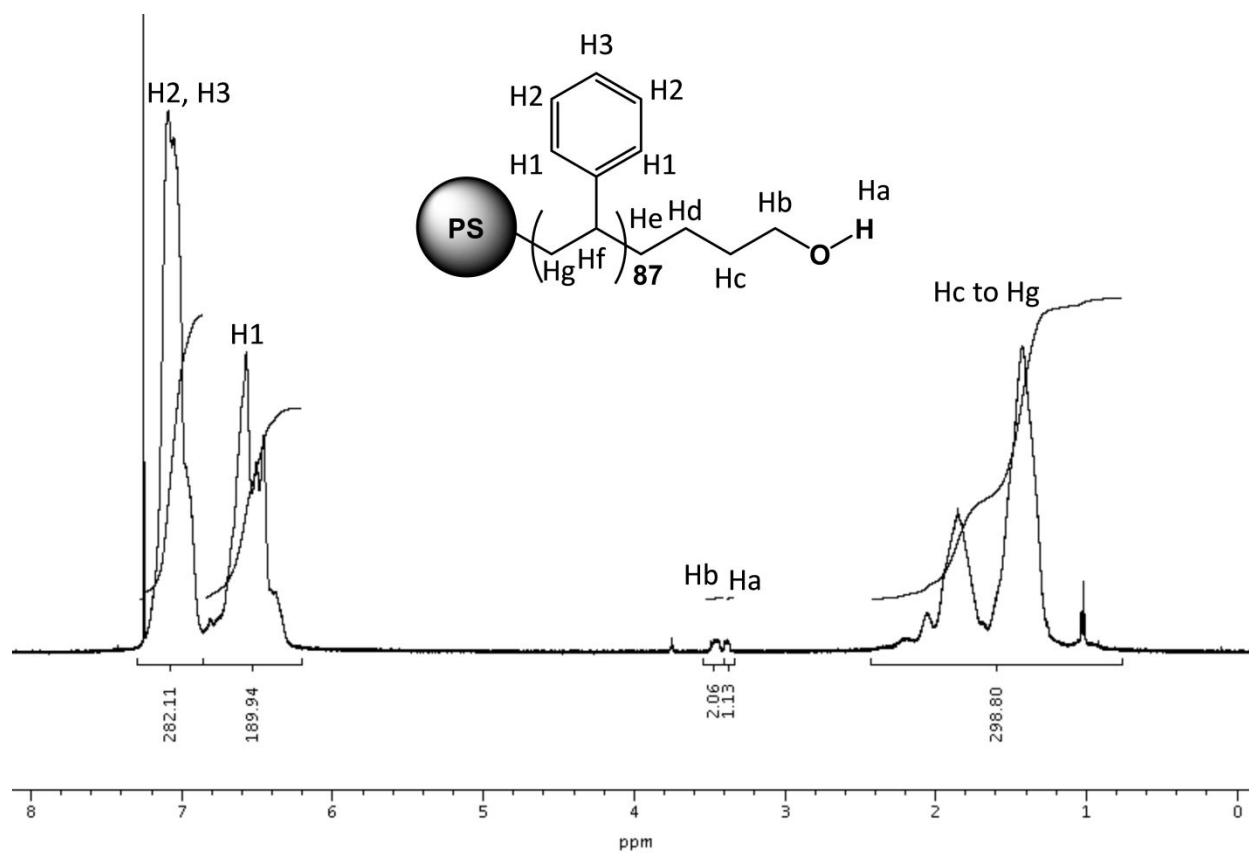


Figure S12. ¹H NMR spectrum of deprotected polystyrene core of PSC 3.

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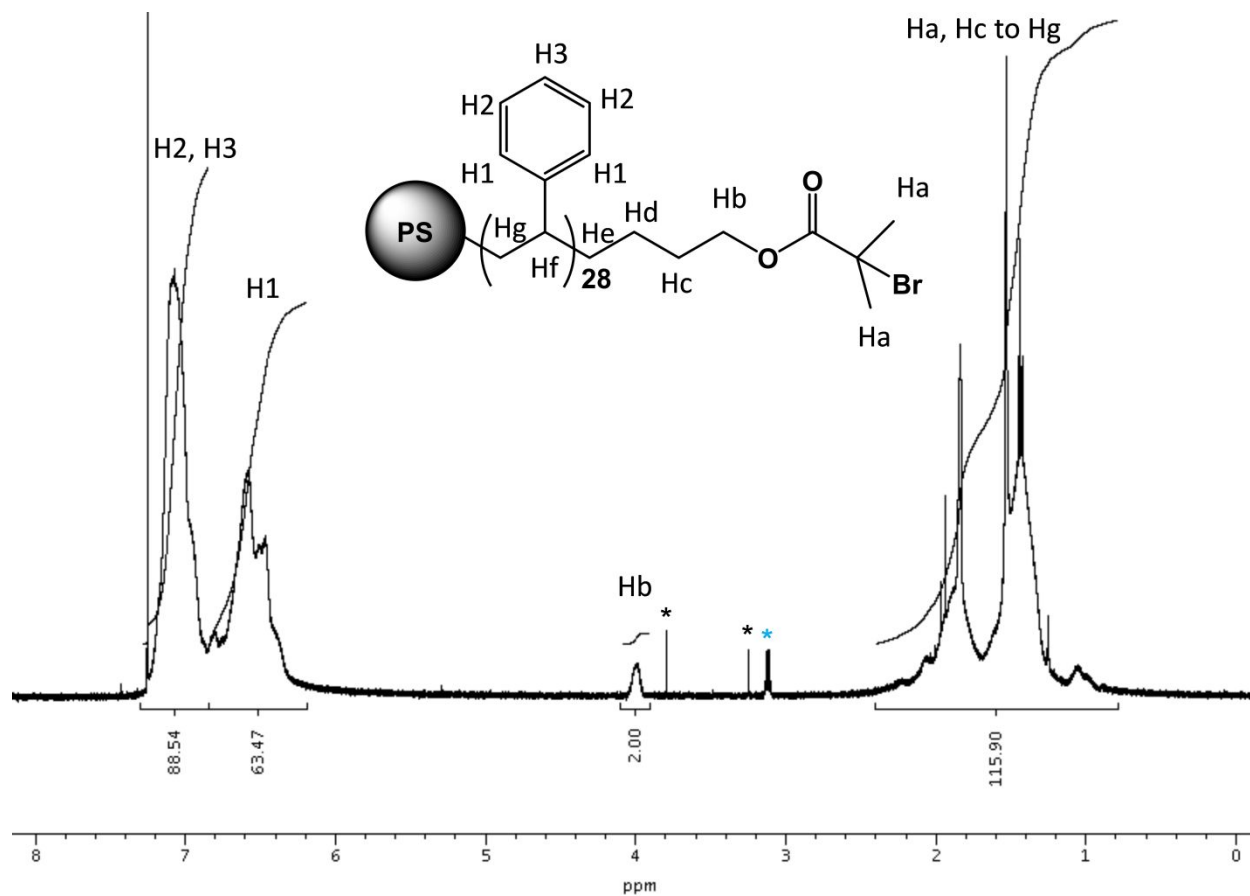


Figure S13. ^1H NMR spectrum of ATRP initiator immobilized polystyrene core of PSC 1; the peaks marked by black stars are origination from the residual solvents; the peak marked by a blue star may be due to the residual $\text{Et}_3\text{N}\cdot\text{HCl}$.

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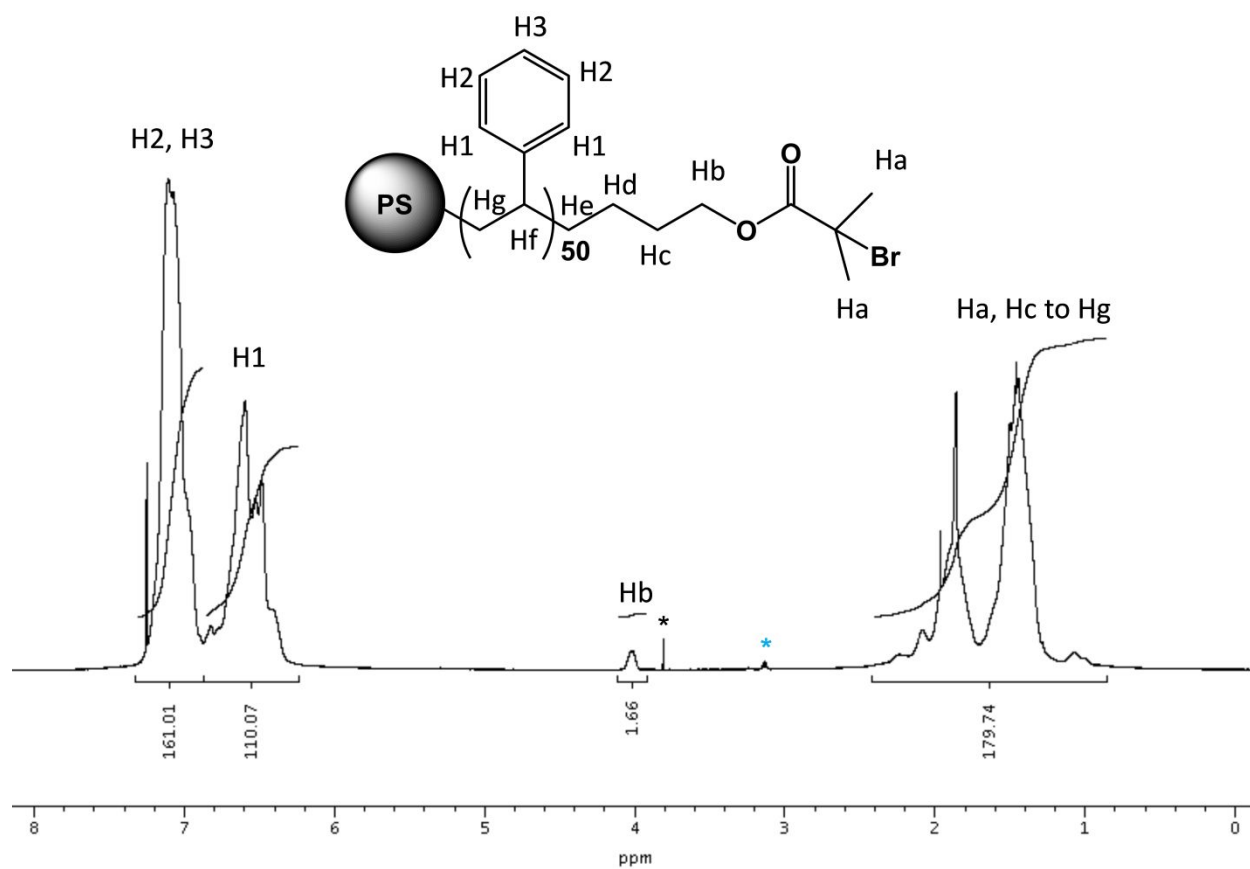


Figure S14. ^1H NMR spectrum of ATRP initiator immobilized polystyrene core of PSC 2; the peak marked by a black star is origination from the residual solvents; the peak marked by a blue star may be due to the residual $\text{Et}_3\text{N}\cdot\text{HCl}$.

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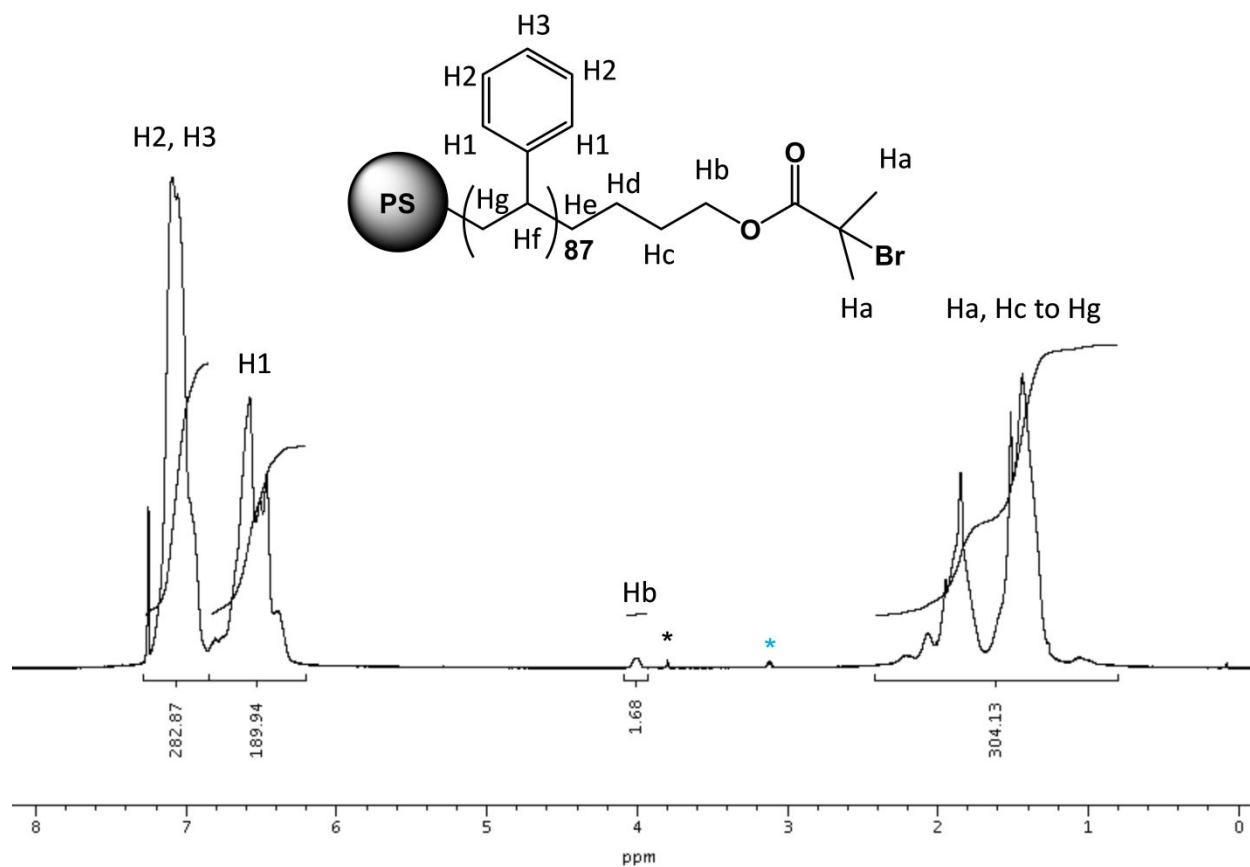
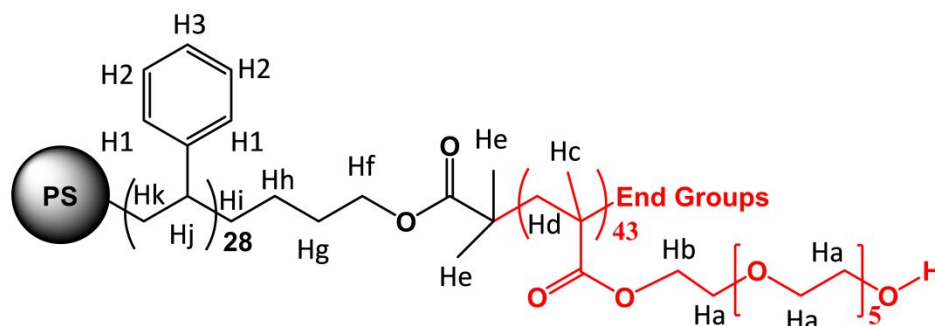


Figure S15. ^1H NMR spectrum of ATRP initiator immobilized polystyrene core of PSC 3; the peak marked by a black star is origination from the residual solvents; the peak marked by a blue star may be due to the residual $\text{Et}_3\text{N}\cdot\text{HCl}$.

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End Groups: Cl or Br or O-O-H or derivative of hydroquinone inhibitor

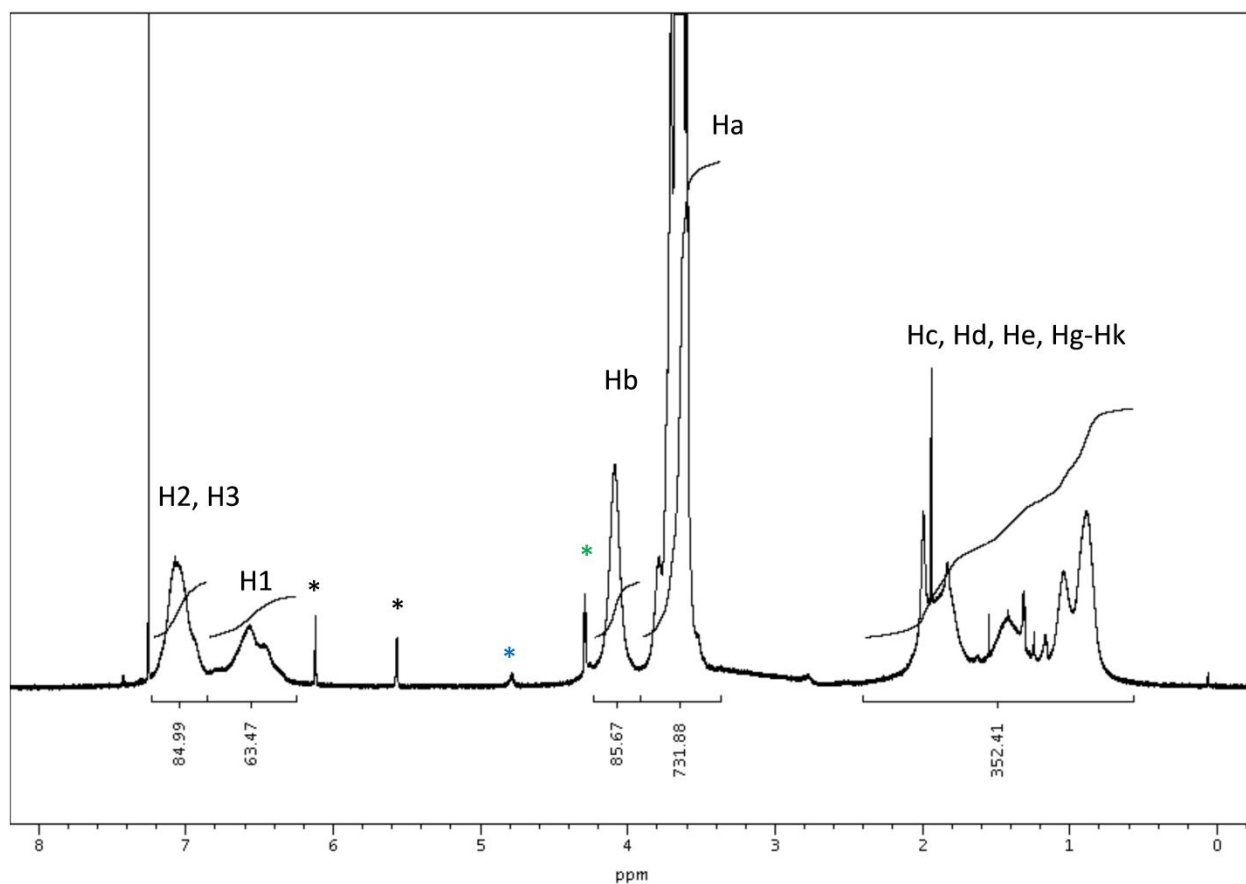


Figure S16. ^1H NMR spectrum of SP1. The peaks marked by black stars may be due to residual PEGMA monomer; the peak marked by a blue star may be due to the OH proton resonance of C-O-O-H of the end groups; the peak marked by a green star may be due to the CH₂-CH₂-O- protons of the residual PEGMA monomers or the OH proton of the PEGMA terminal groups.

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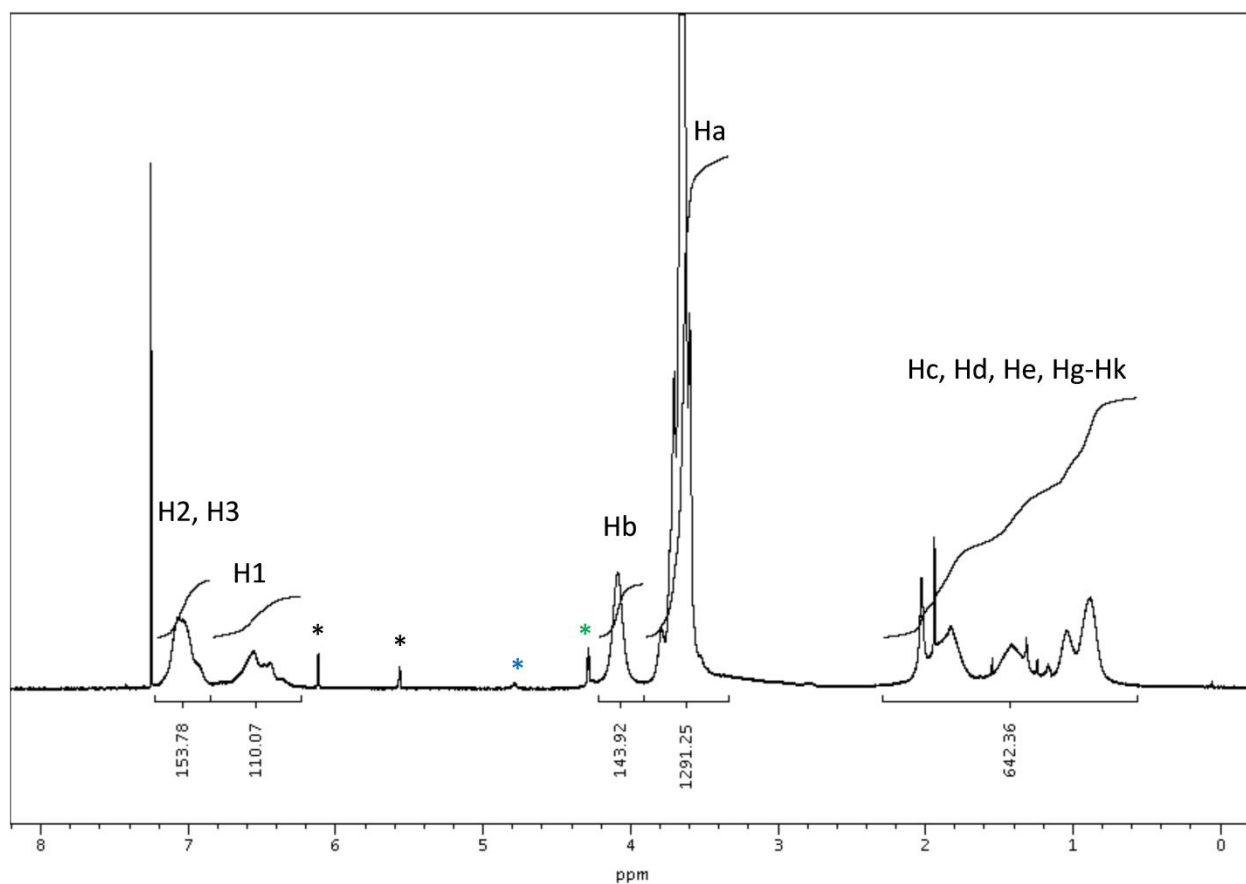
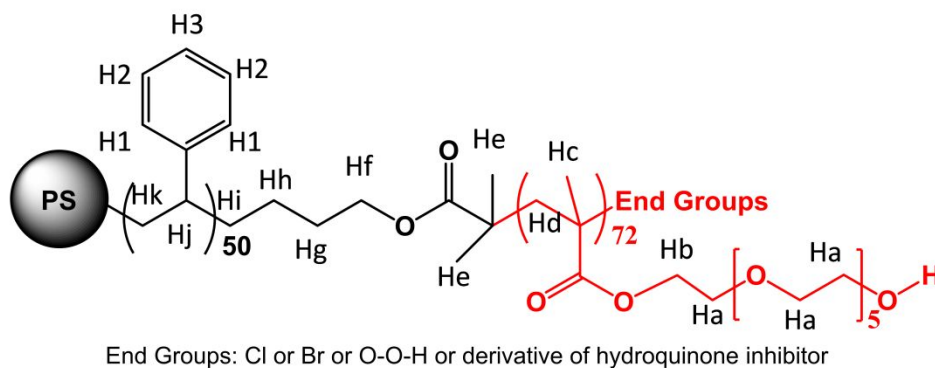


Figure S17. ^1H NMR spectrum of SP2. The peaks marked by black stars may be due to residual PEGMA monomer; the peak marked by a blue star may be due to the OH proton resonance of C-O-O-H of the end groups; the peak marked by green star may be due to the CH₂-CH₂-O- protons of the residual PEGMA monomers or the OH proton of the PEGMA terminal groups.

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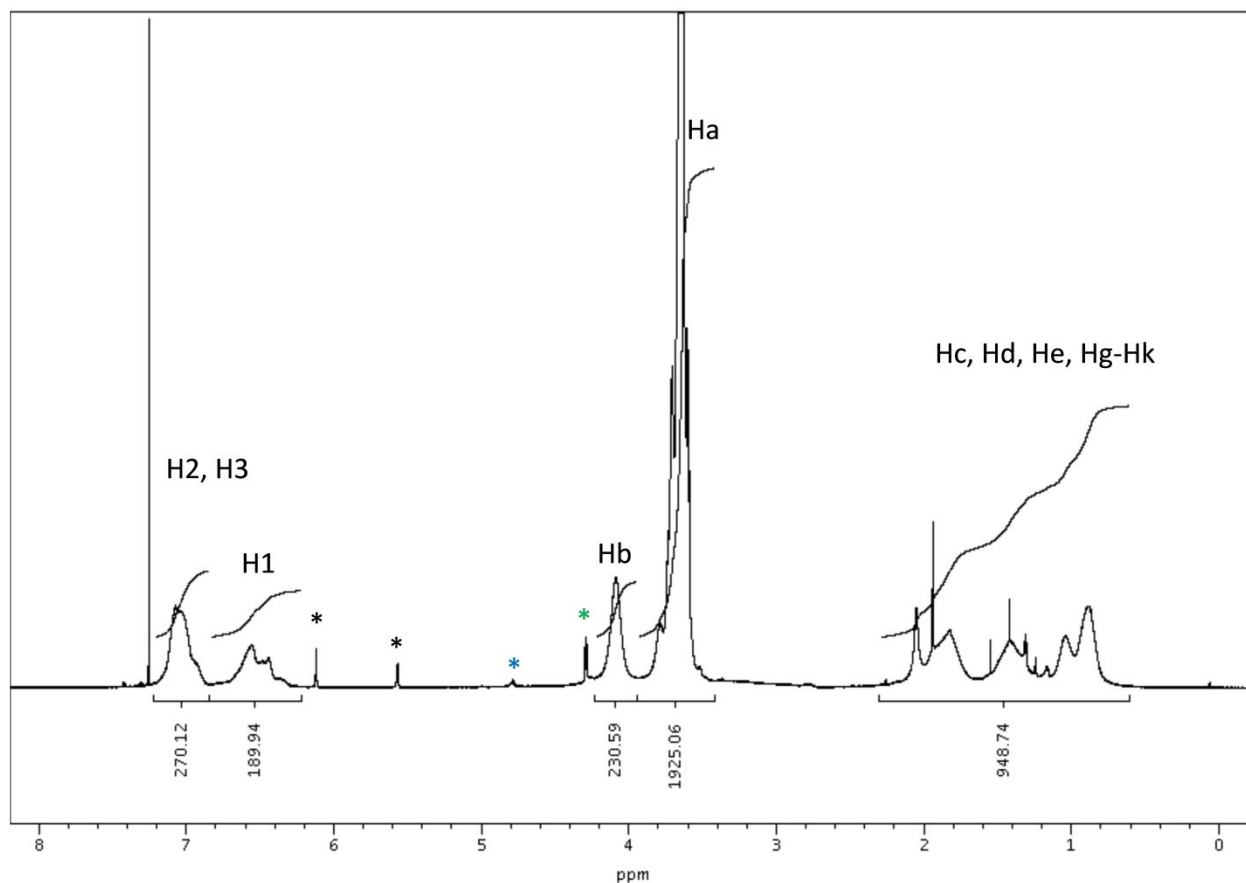
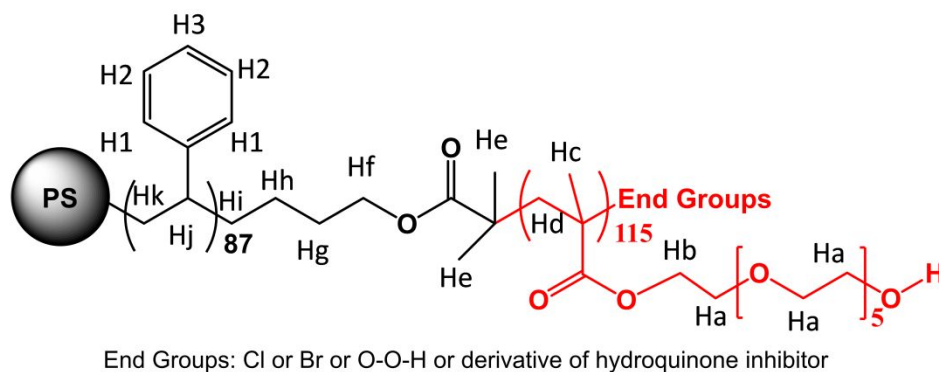


Figure S18. ^1H NMR spectrum of SP3. The peaks marked by black stars may be due to residual PEGMA monomer; The peak marked by a blue star may be due to the OH proton resonance of C-O-O-H of the end groups; the peak marked by a green star may be due to the CH₂-CH₂-O- protons of the residual PEGMA monomers or the OH proton of the PEGMA terminal groups.

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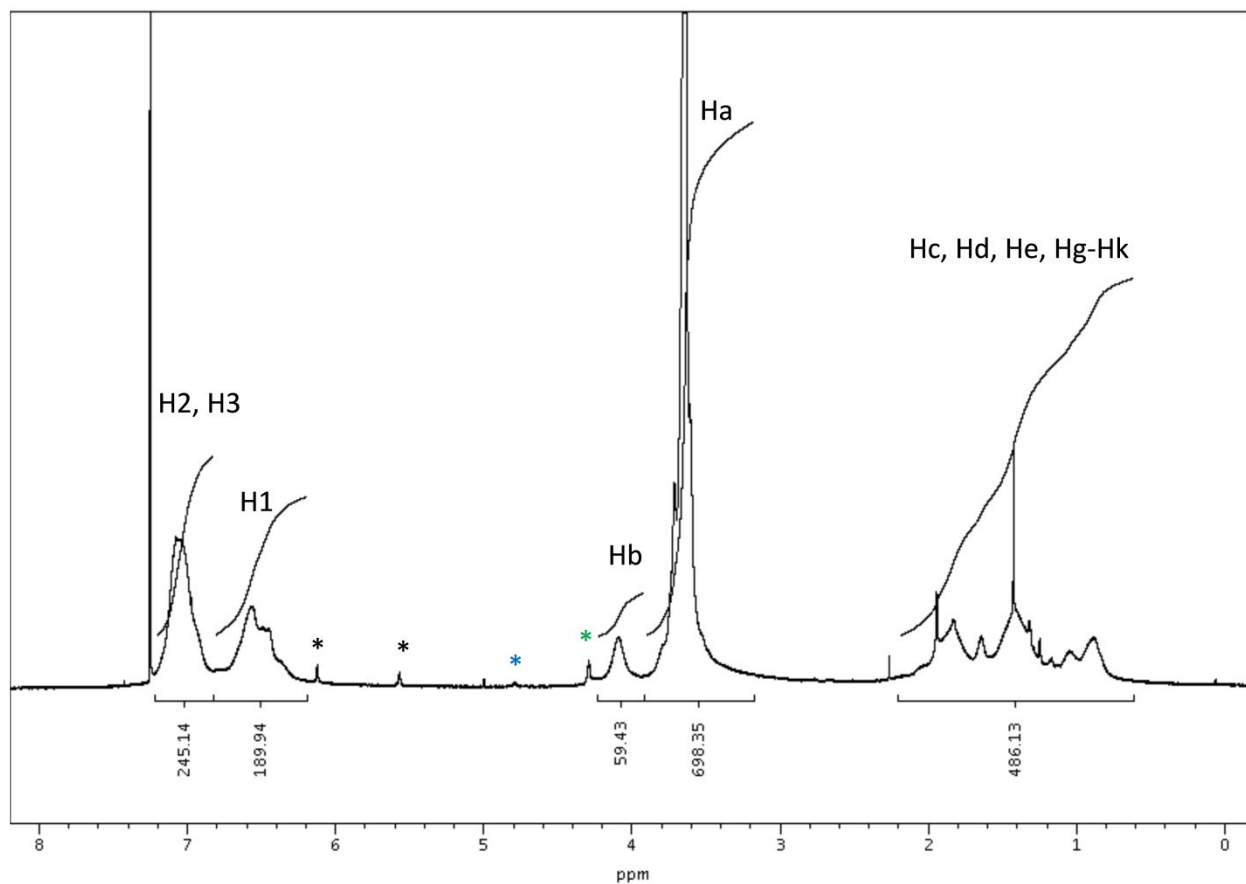
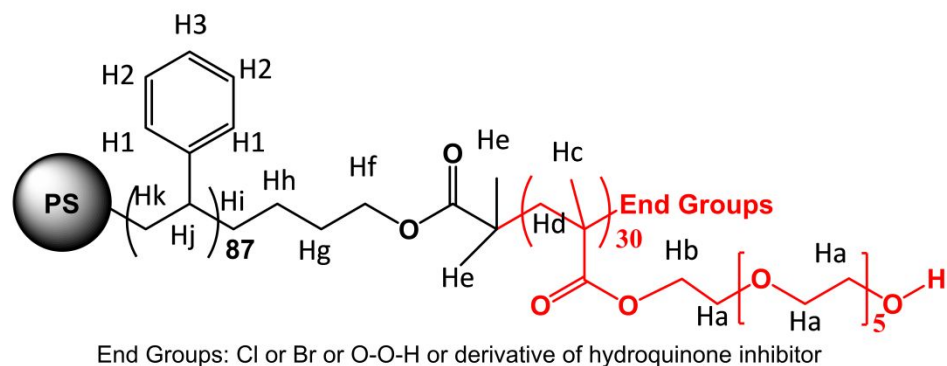


Figure S19. ^1H NMR spectrum of SP4. The peaks marked by black stars may be due to residual PEGMA monomer; the peak marked by a blue star may be due to the OH proton resonance of C-O-O-H of the end groups; the peak marked by a green star may be due to the CH₂-CH₂-O- protons of the residual PEGMA monomers or the OH proton of the PEGMA terminal groups.

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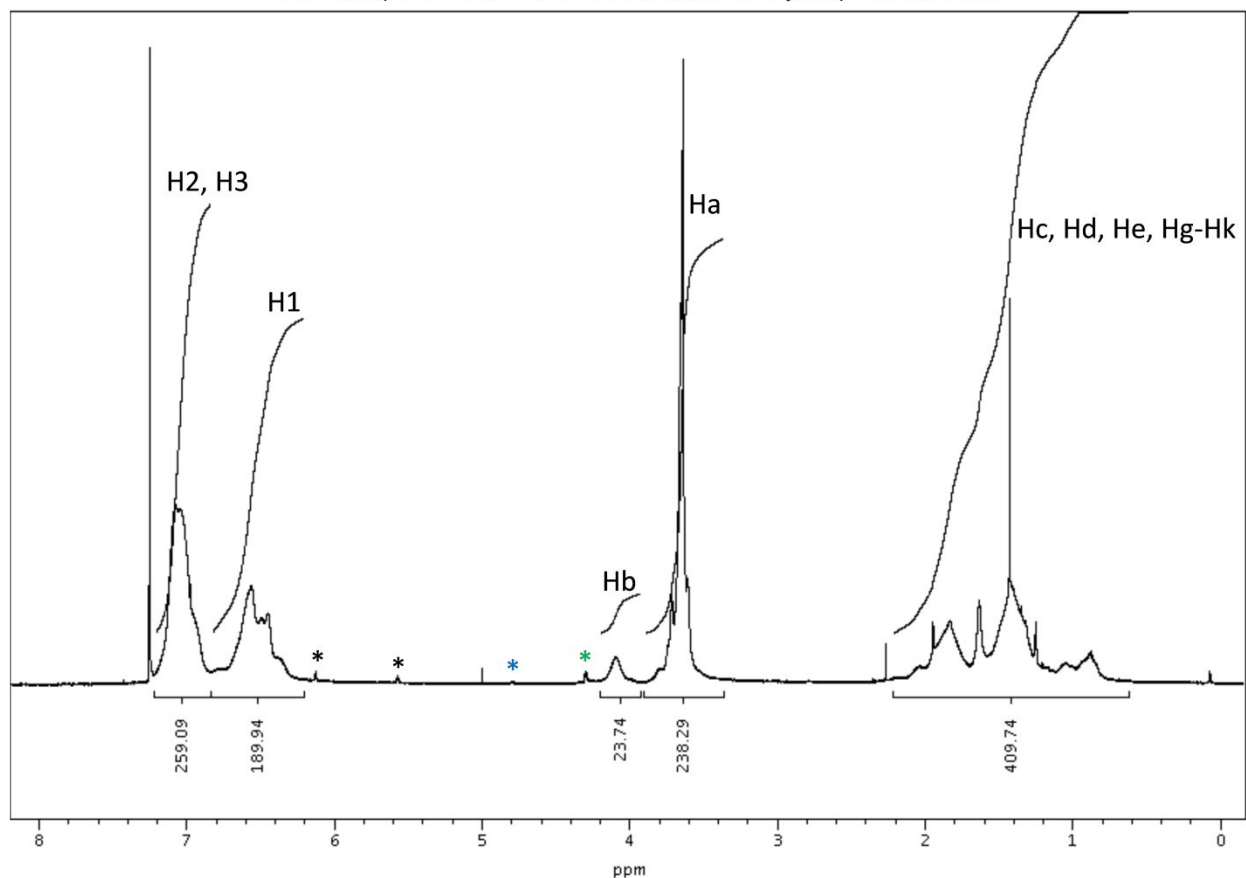
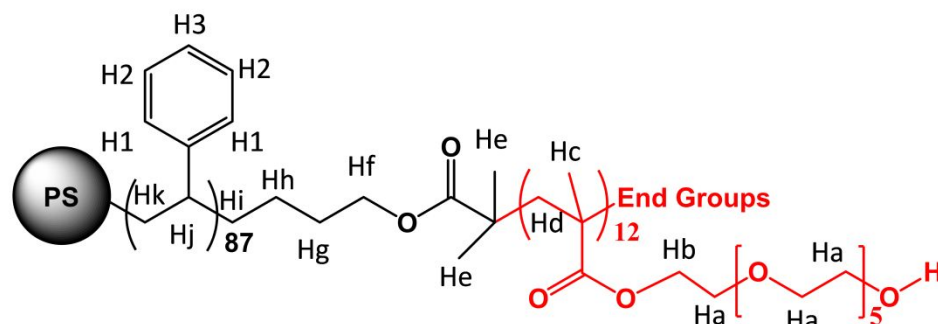


Figure S20. ^1H NMR spectrum of SP5. The peaks marked by black stars may be due to residual PEGMA monomer; the peak marked by a blue star may be due to the OH proton resonance of C-O-O-H of the end groups; peaks marked by green stars may be due to the CH₂-CH₂-O- protons of the residual PEGMA monomers or the OH proton of the PEGMA terminal groups.

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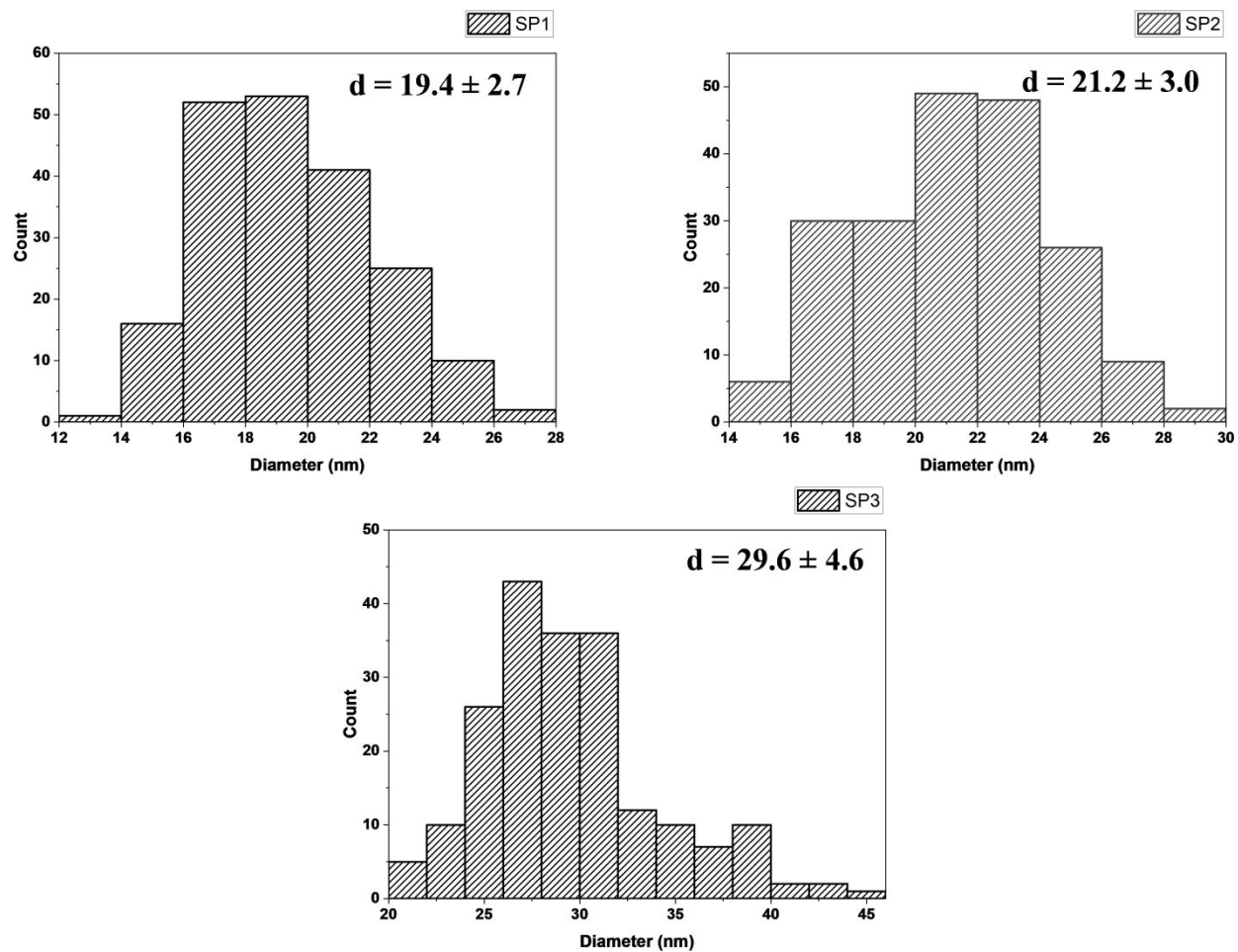


Figure S21. Size distribution histogram of SPs based on the counting of 200 SPs.

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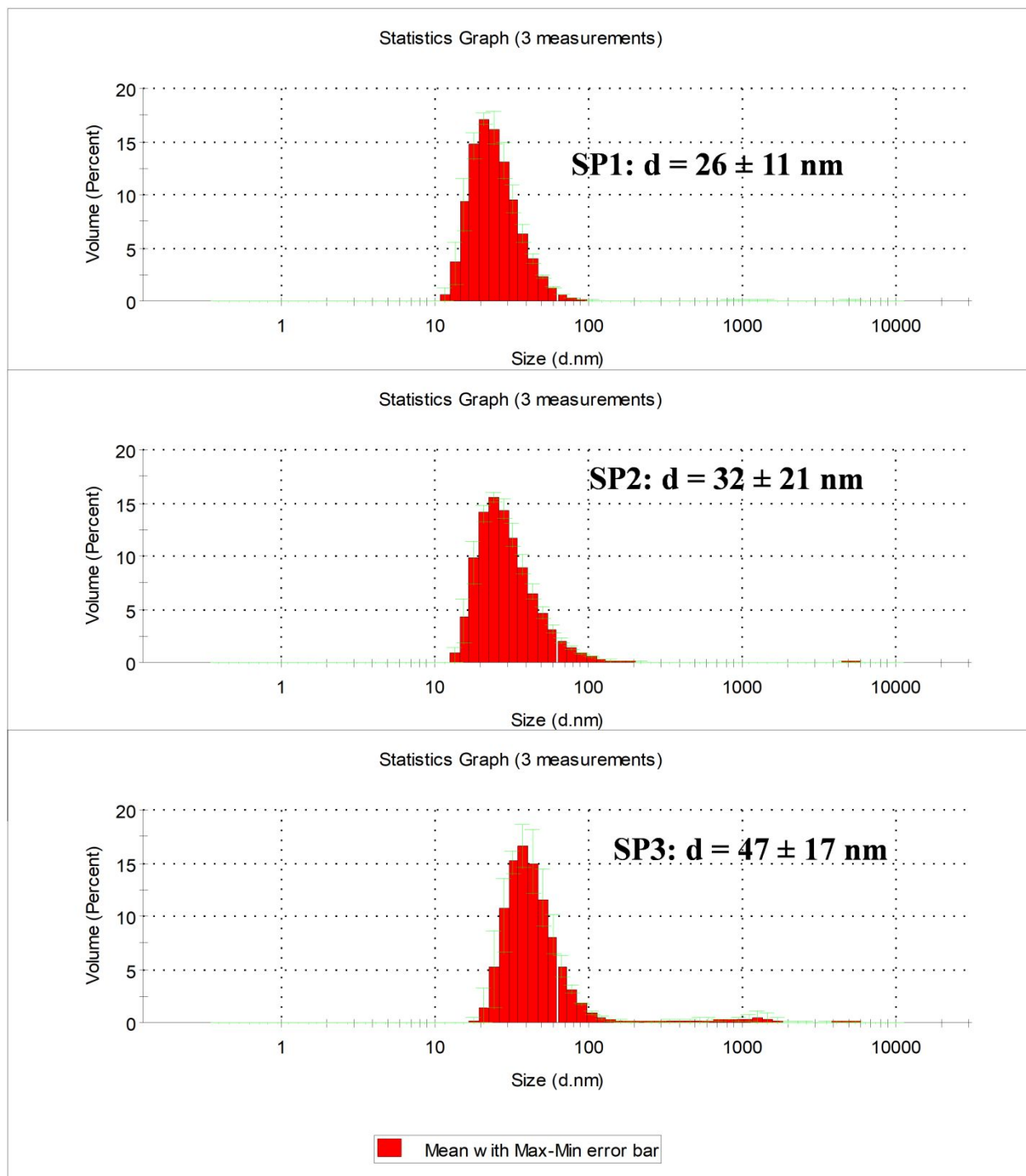


Figure S22. Statistics of the hydrodynamic diameter of the SPs.

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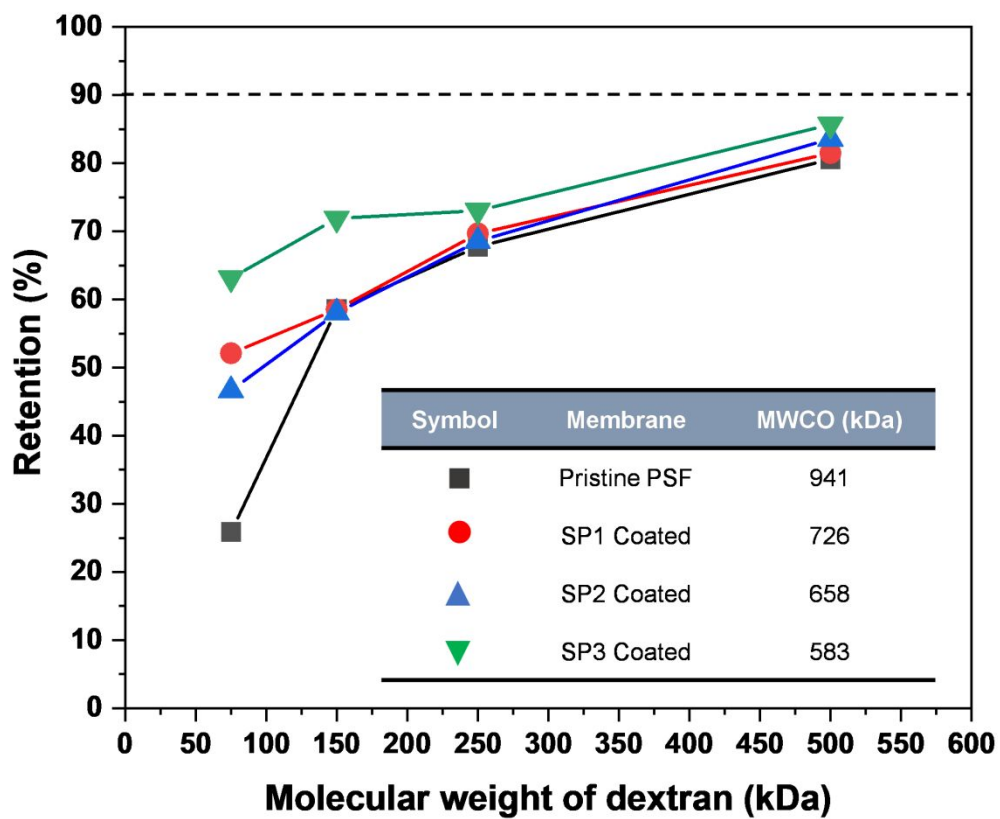


Figure S23. Evaluation of the stability of the SPs coatings on PSF UF membranes upon surfactant washing from the MWCO measurements.

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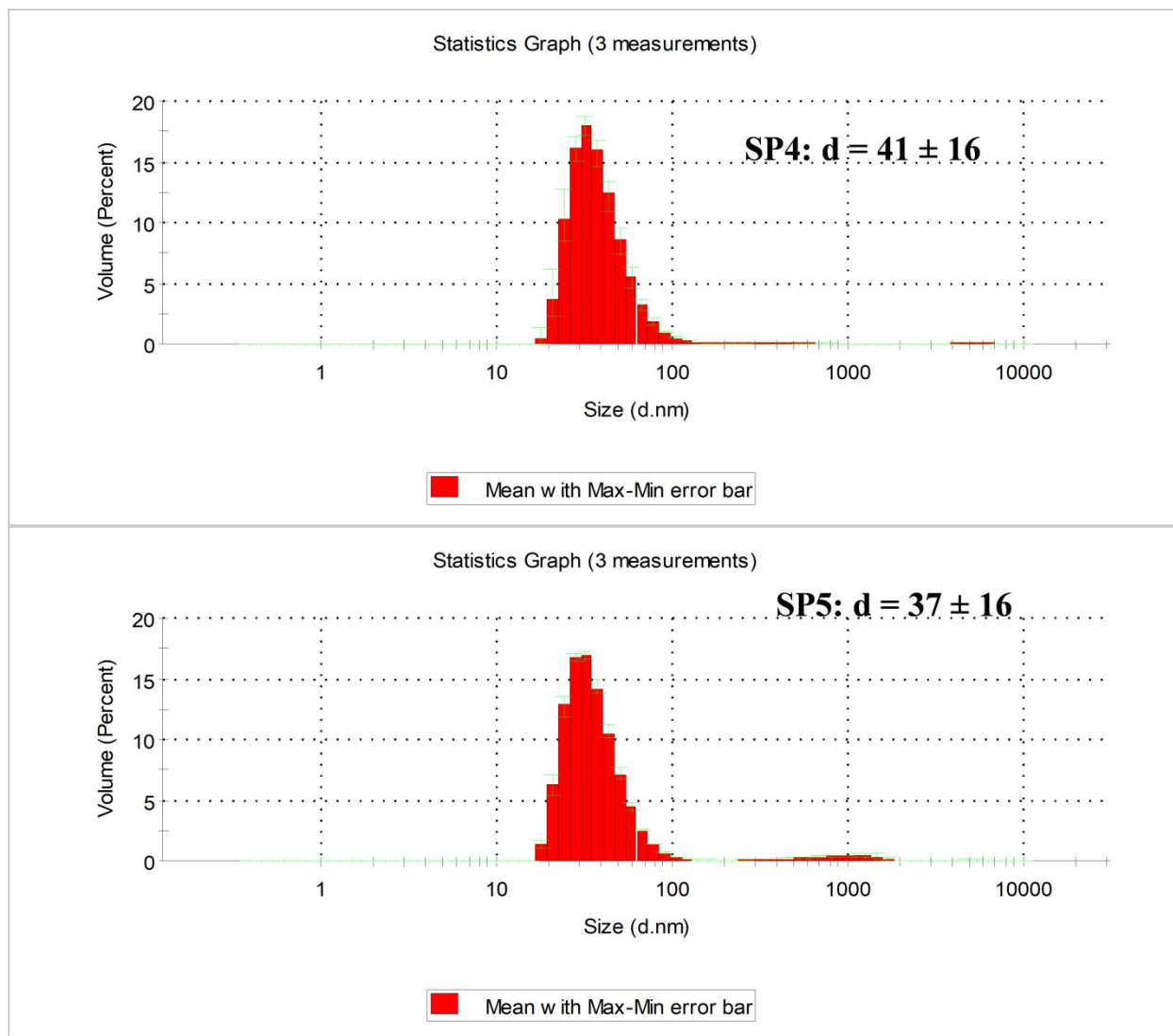


Figure S24. Statistics of the hydrodynamic diameter of the SP4 and SP5 with 28 and 12 PEGMA repeating units built on the same PS core as SP3.