Supporting Information

Surface Modification of Polydopamine Particles with Polyethyleneimine Brushes for Enhanced Stability and Reduced Fragmentation

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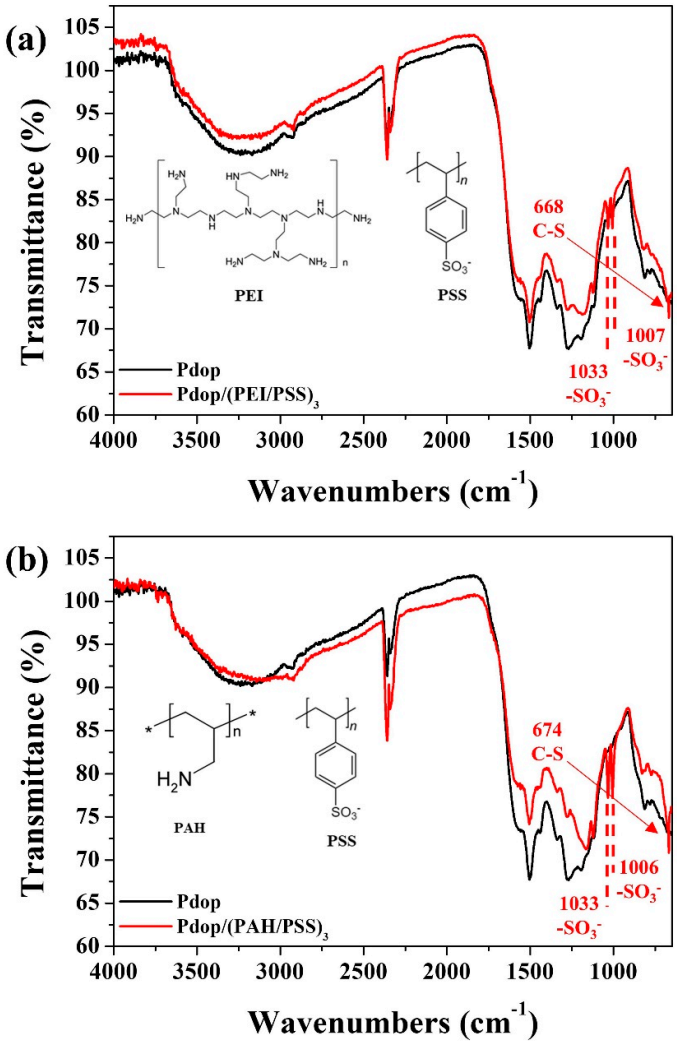


Figure S1. FT-IR spectra of (a) Pdop/(PEI/PSS)$_3$ and (b) Pdop/(PAH/PSS)$_3$ multilayers.

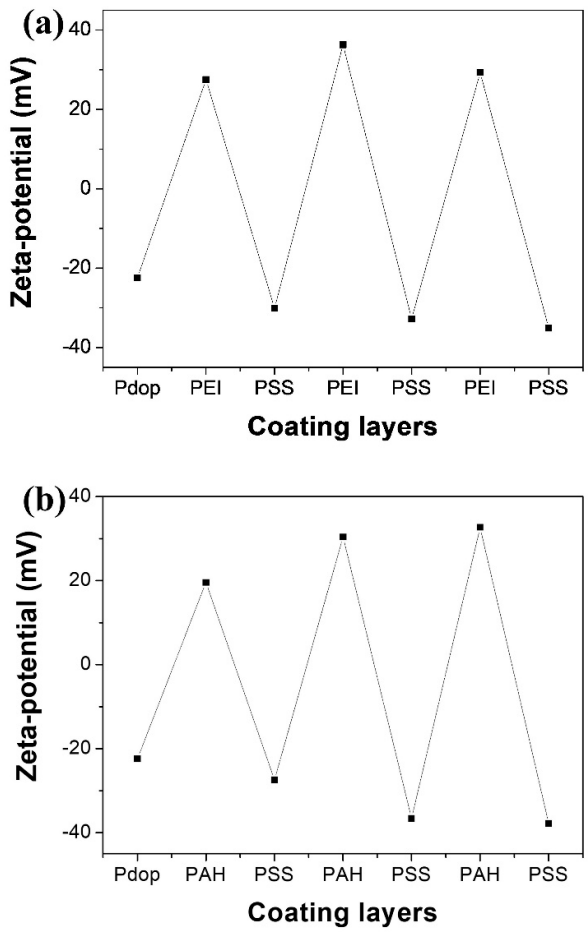


Figure S2. Zeta-potential measurements of (a) Pdop/(PEI/PSS)$_3$ and (b) Pdop/(PAH/PSS)$_3$ multilayers.

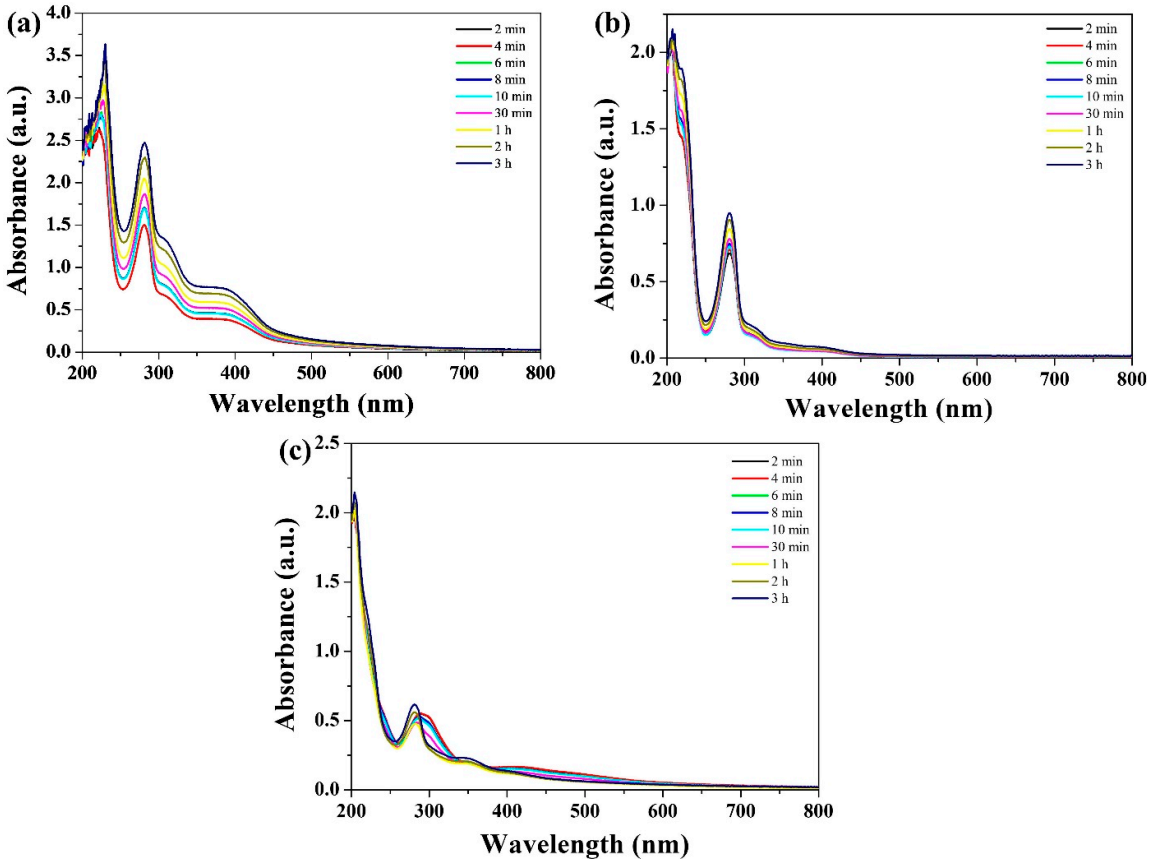


Figure S3. UV-Vis absorption spectra of Pdop fragments released from Pdop particles at (a) pH 3, (b) pH 5, and (c) pH 9 as a function of time.

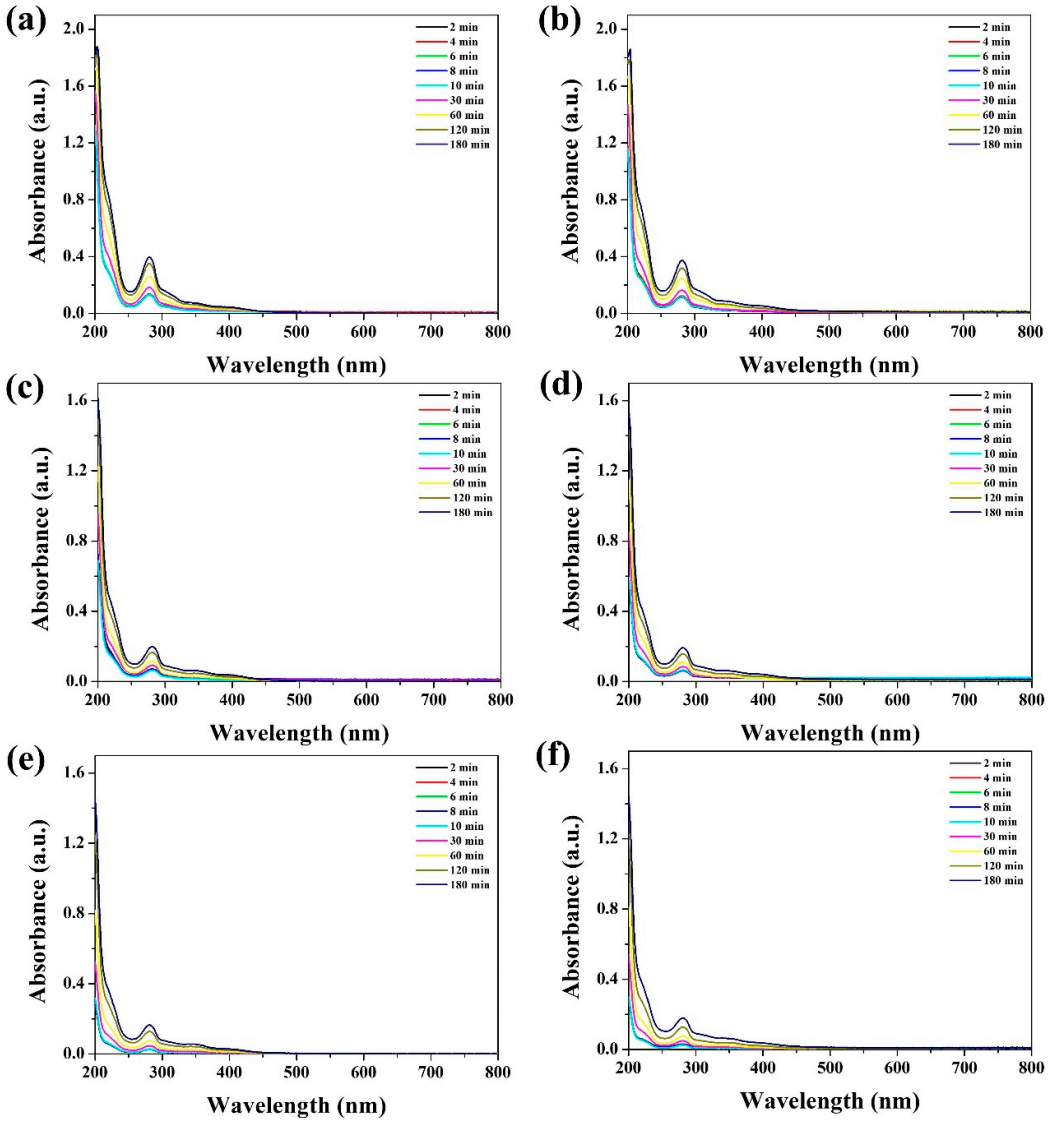


Figure S4. UV-Vis absorption spectra of Pdop fragments released from (a) Pdop/PEI, (b) Pdop/PEI/PSS, (c) Pdop/(PEI/PSS)/PEI, (d) Pdop/$(PEI/PSS)_2$, (e) Pdop/$(PEI/PSS)_2$/PEI, and (f) Pdop/$(PEI/PSS)_3$ particles at pH 6.8 as a function of time.

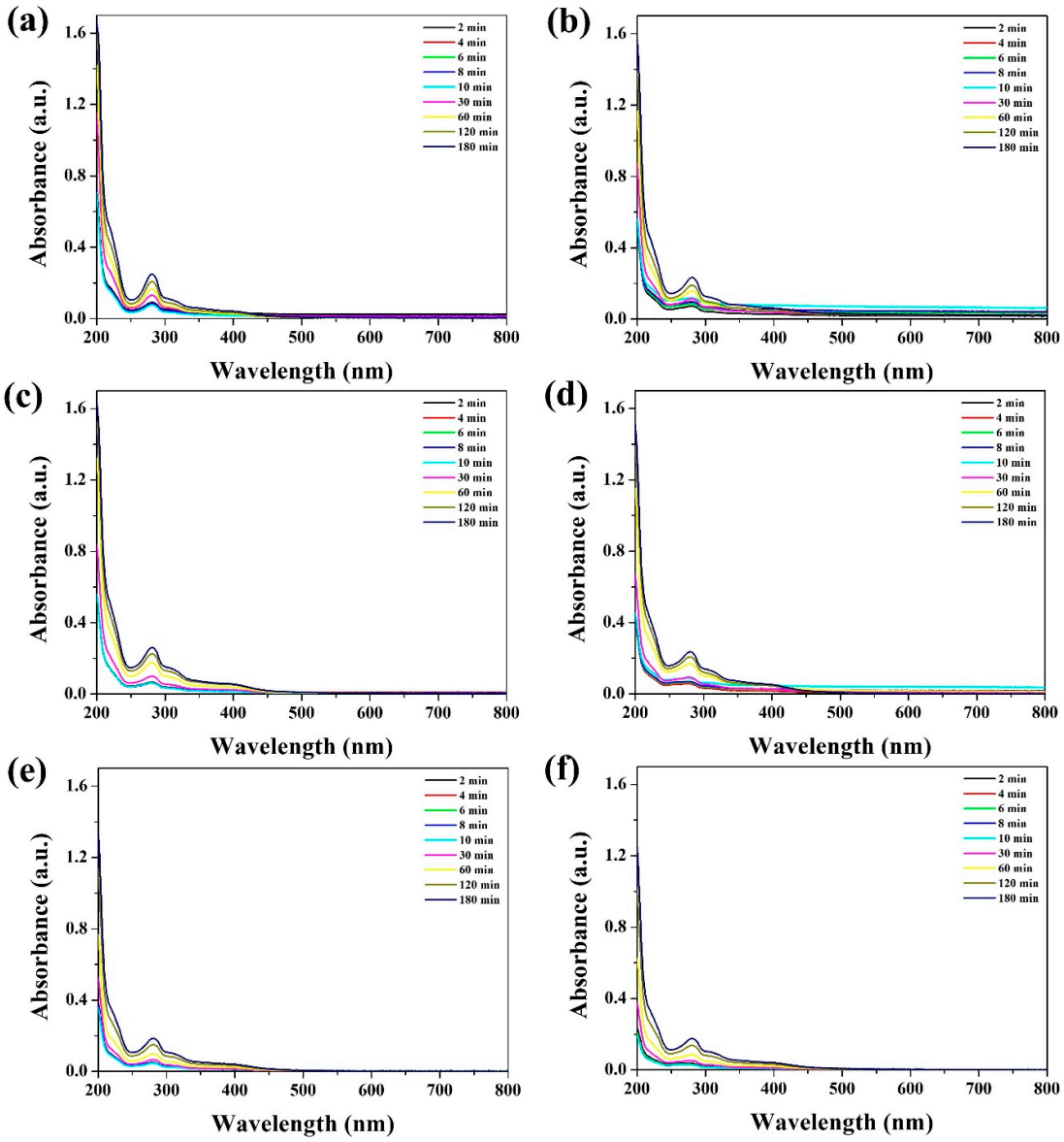
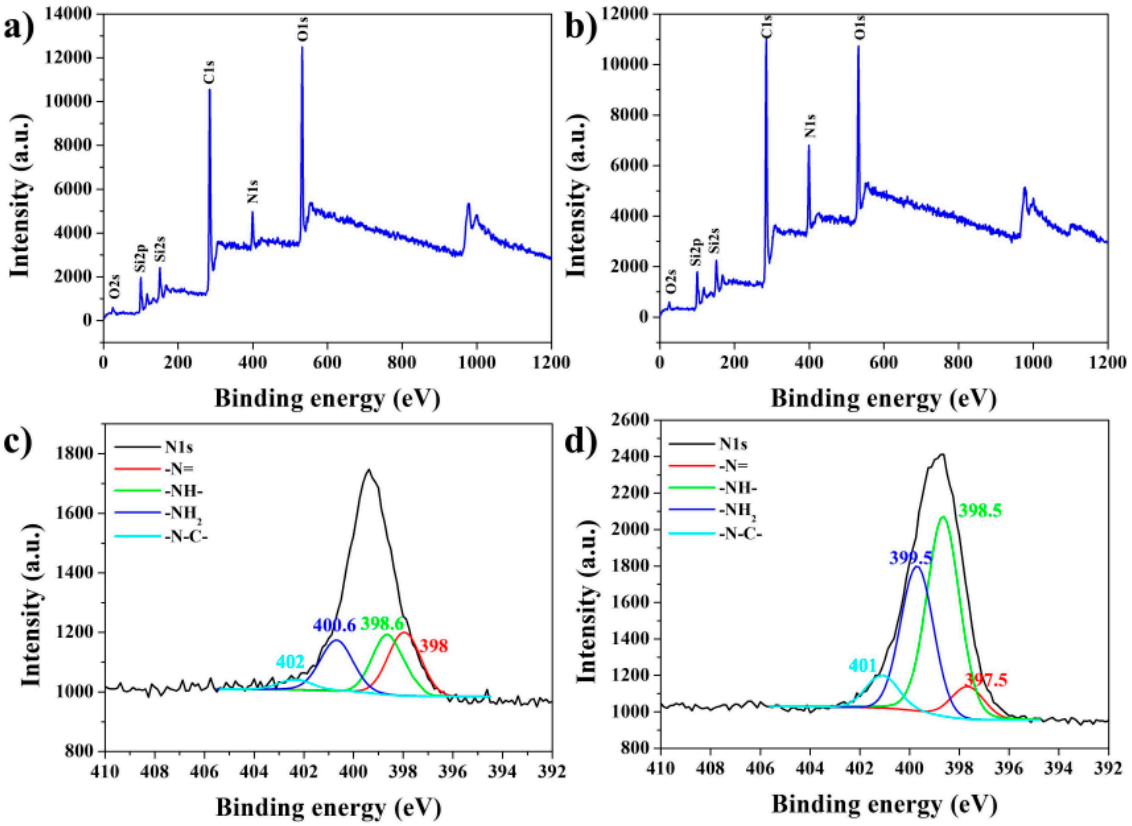


Figure S5. UV-Vis absorption spectra of Pdop fragments released from (a) Pdop/PAH, (b) Pdop/PAH/PSS, (c) Pdop/(PAH/PSS)/PAH, (d) Pdop/$(PAH/PSS)_2$, (e) Pdop/$(PAH/PSS)_2$/PAH, and (f) Pdop/$(PAH/PSS)_3$ particles at pH 6.8 as a function of time.



e)

	%Area	
	Pdop	Pdop/PEI brush
-N=	32.02	8.10
-NH-	30.83	49.63
$-NH_2$	30.94	34.46
-N-C-	6.21	7.81

Figure S6. X-ray photoelectron spectroscopy (XPS) spectra of (a, c) Pdop particles and (b, d) Pdop/PEI brush particles. High-resolution N 1s spectra of Pdop particles (c) before and (d) after PEI grafting, with peak deconvolution. (e) Percentage (%) surface area of N-containing functional groups (-N=, -NH-, $-NH_2$, and -N-C-) observed in Pdop and Pdop/PEI brush samples.

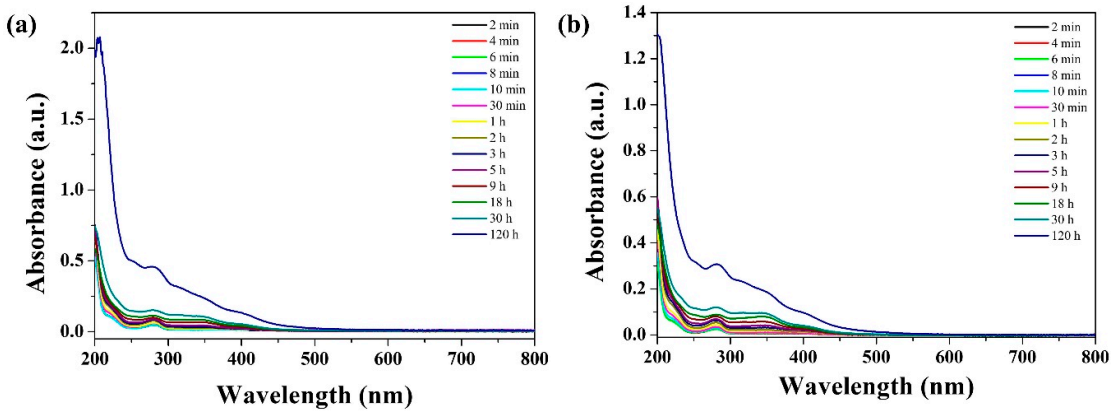


Figure S7. UV-Vis absorption spectra of Pdop fragments released from (a) Pdop/Short-PEI brush and (b) Pdop/Long-PEI brush particles at pH 6.8 as a function of time.

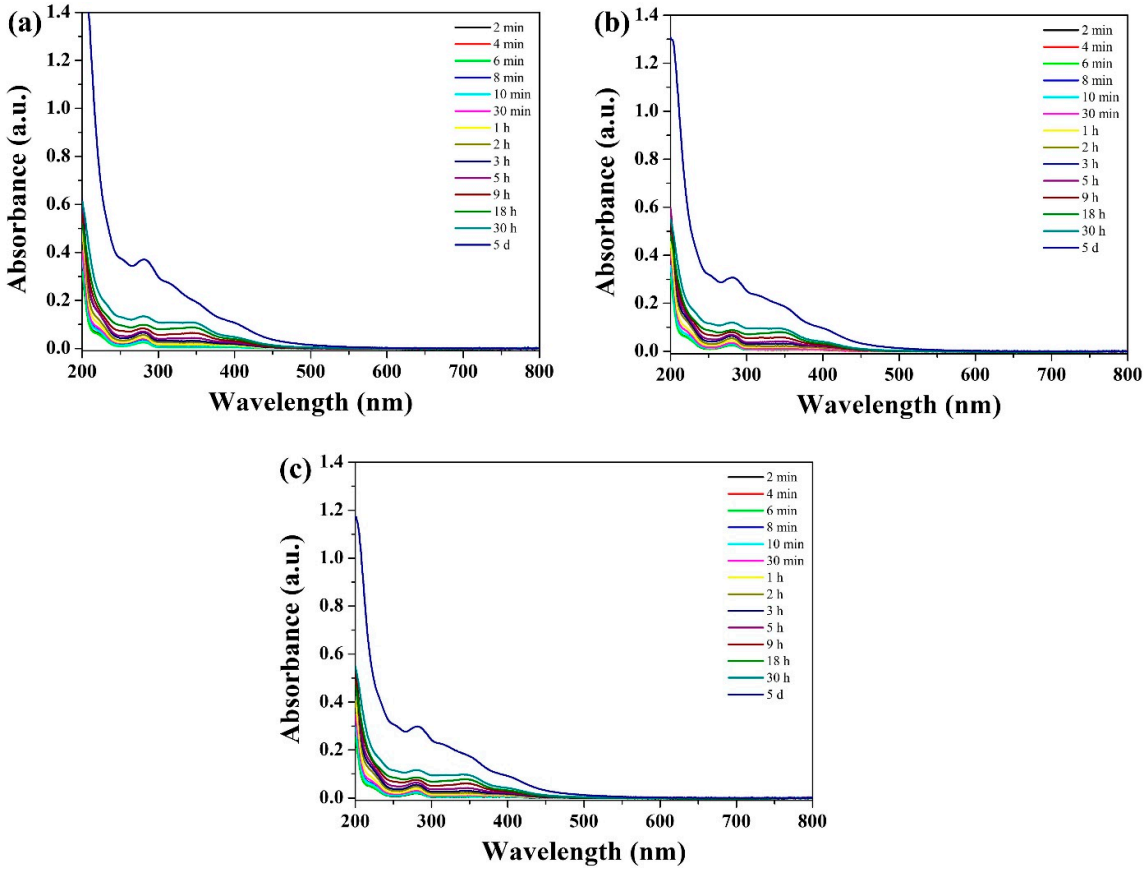


Figure S8. UV-Vis absorption spectra of Pdop fragments released from Pdop particles grafted with L-PEI brushes of (a) low, (b) medium, and (c) high grafting densities at pH 6.8 as a function of time.

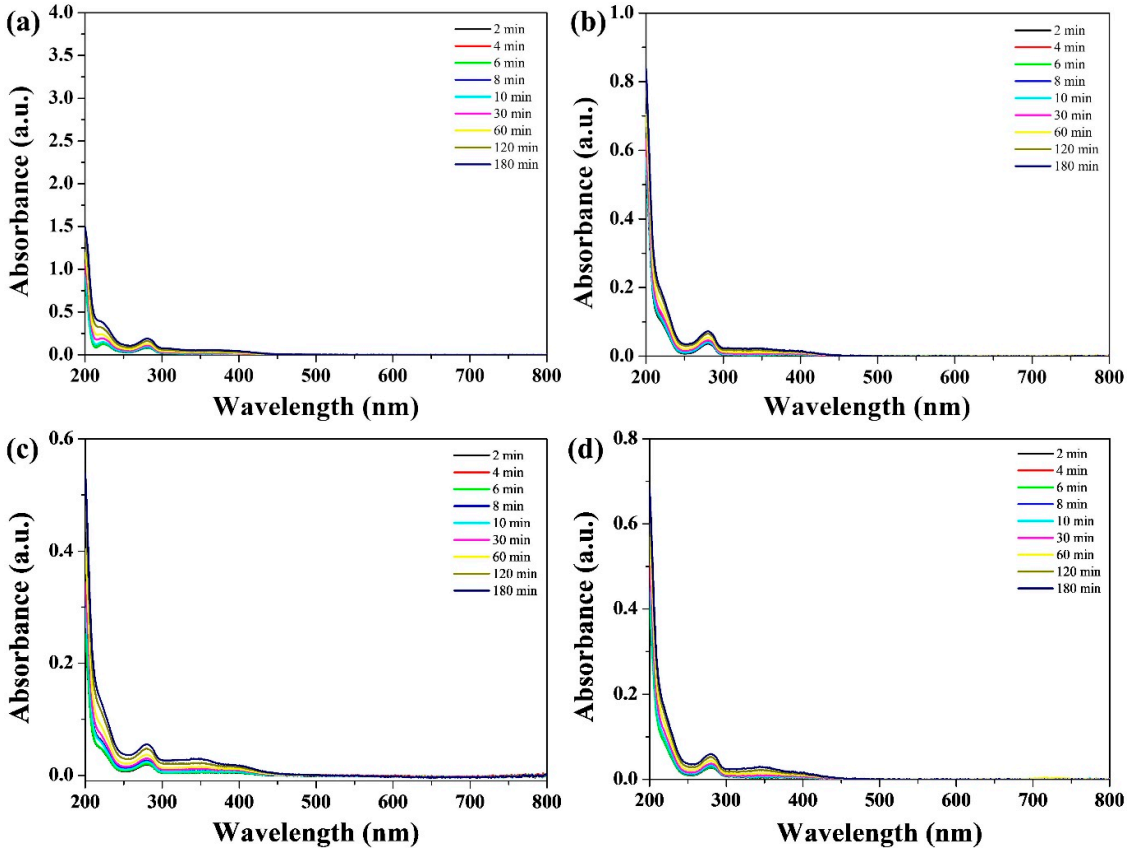


Figure S9. UV-Vis absorption spectra of Pdop fragments released from Pdop particles grafted with L-PEI brushes of high grafting density at (a) pH 3, (b) pH 5, (c) pH 6.8, and (d) pH 9 as a function of time.

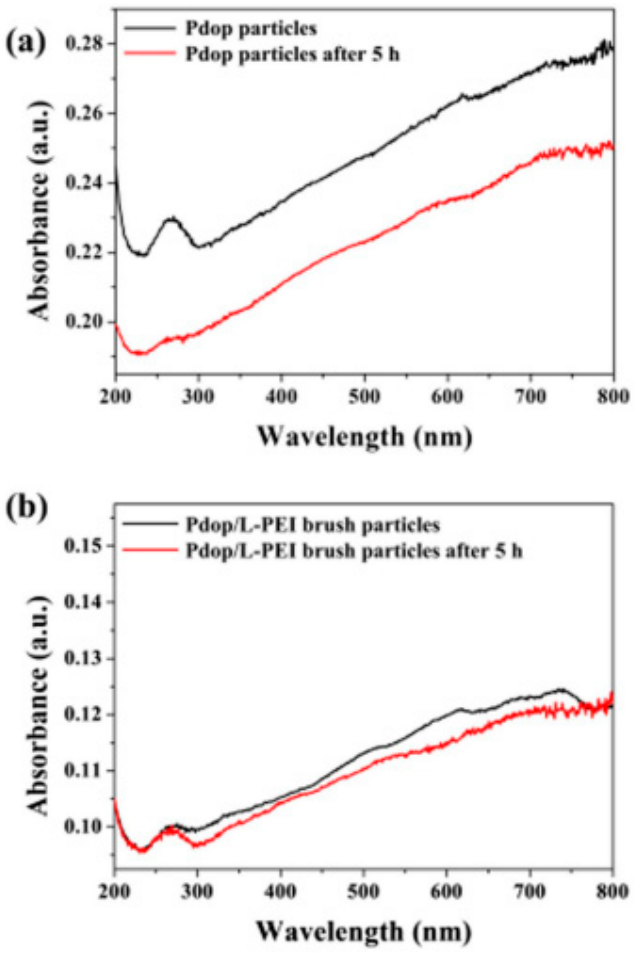


Figure S10. UV-Vis absorption spectra of (a) Pdop particles and (b) Pdop/PEI brush particles before and after dispersion in water at pH 6.8 for 5 h.