

Supporting Information

Synthesis and solution self-assembly of poly(1,3-dioxolane)

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Table S1. Homopolymerization of DO by various catalysts.

Run	Catalyst	$M_{n,SEC}$ (kDa)	\bar{D}_{SEC}	Ref.
1 ^a	terephthaloyl ditriflate	6.7	1.90	1
2 ^b		9.7	2.00	
3 ^a	Maghnite-H ⁺	2.2	1.52	2,3
4 ^b		6.5	2.16	
5 ^a	methacrylic acid/ dicyclohexylcarbodiimide	2.5	1.40	4
6 ^b		9.2	2.20	
7 ^a	dialkylformal	1.7	1.60	5
8 ^b		4.3	1.95	
9 ^b	silver hexafluoroantimonate	13.5	1.67	6

^a Value of \bar{D} is the narrowest value in the corresponding literature examples.

^b Value of \bar{D} is attributed to the polymer of the highest molecular weight.

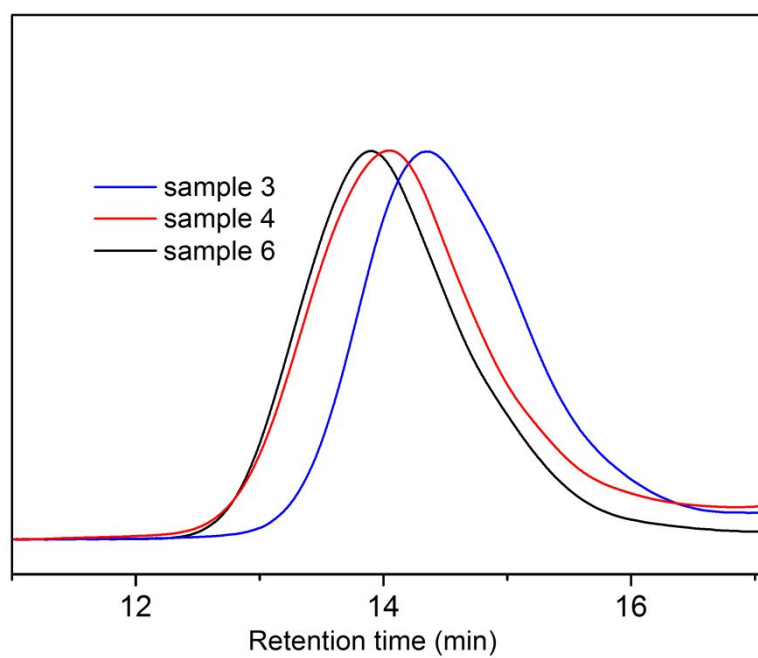


Figure S1. SEC elution traces of PDOs in Table 1.

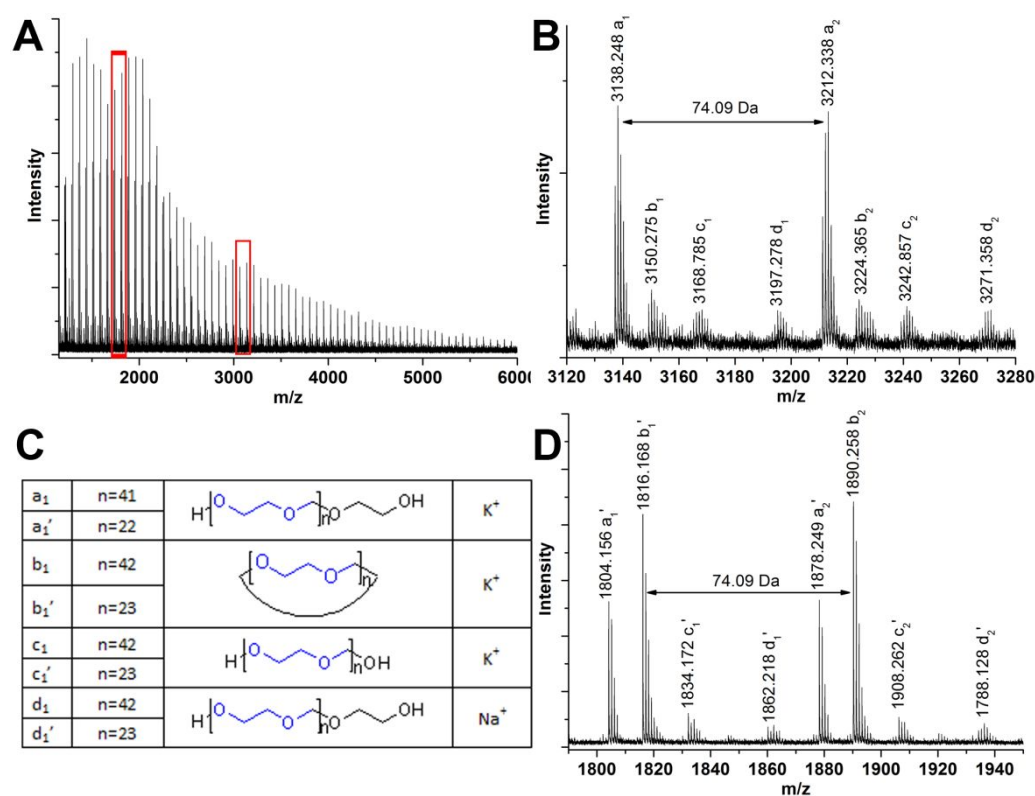


Figure S2. MALDI-ToF mass spectra of Sample 1 in Table 1 (A) with enlarged views (B & D) and the corresponding PDO structures (C). Polymers c_1 (c_1') represent PDO terminated by water with K^+ . Polymers a_1 (a_1') and d_1 (d_1') are PDO chains with ethyl alcohol at chain ends with K^+ and Na^+ , respectively which result from the degradation of formyl segments at chain ends. Polymers b_1 (b_1') are PDO rings caused by backbiting especially in low MW regions.

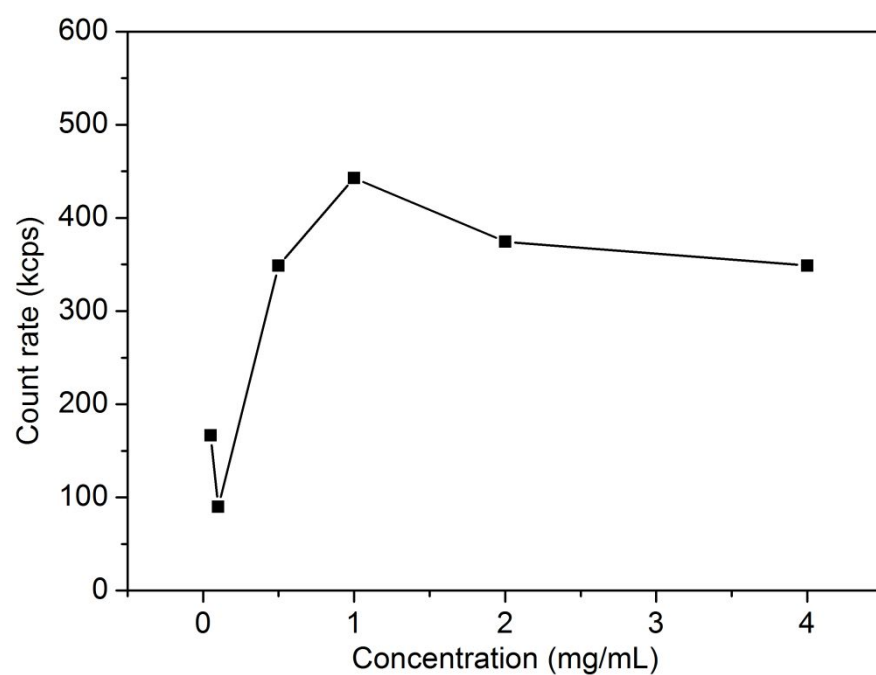


Figure S3. DLS count rates as a function of PDO concentration (Sample 6 in Table 1).

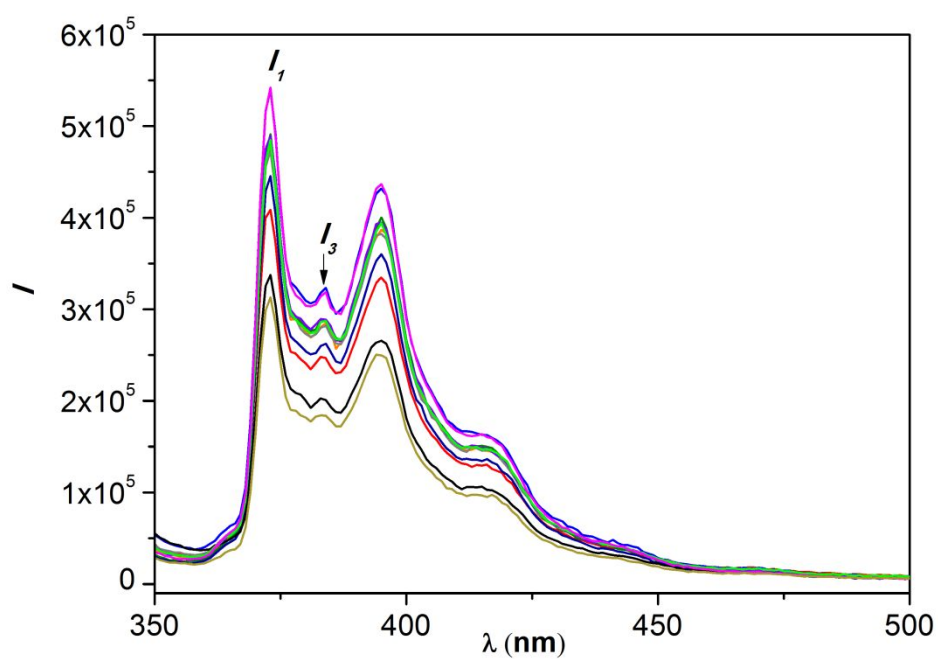


Figure S4. Fluorescence spectra of pyrene in the presence of PDO (Sample 6 in Table 1) at different concentrations ranging from 5×10^{-5} mg/mL to 0.5 mg/mL in aqueous solution.

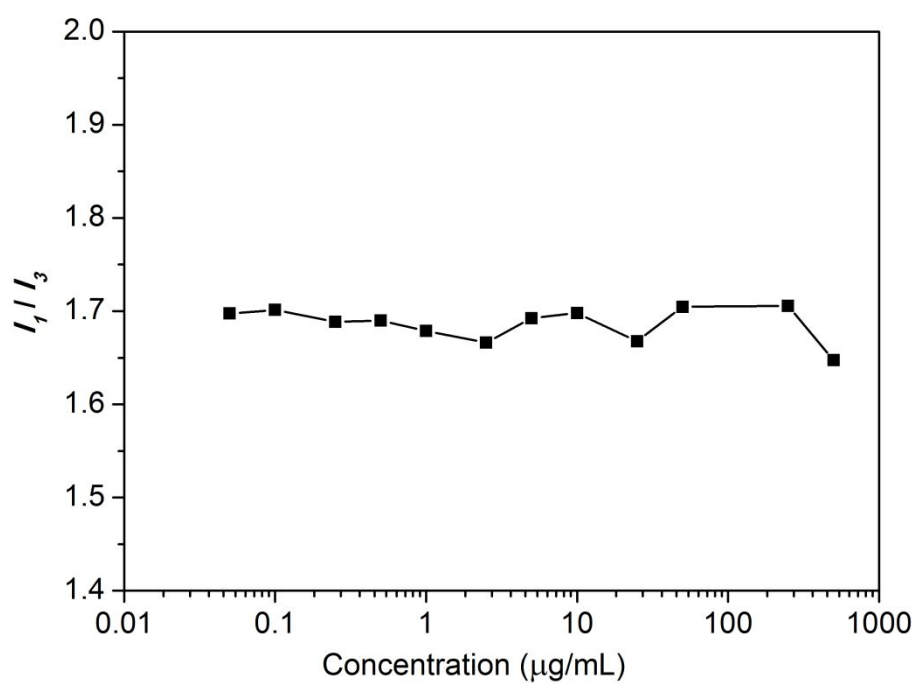


Figure S5. Variation in I_1/I_3 for pyrene as a function of PDO concentration (Sample 6 in Table 1) ranging from 5×10^{-5} mg/mL to 0.5 mg/mL.

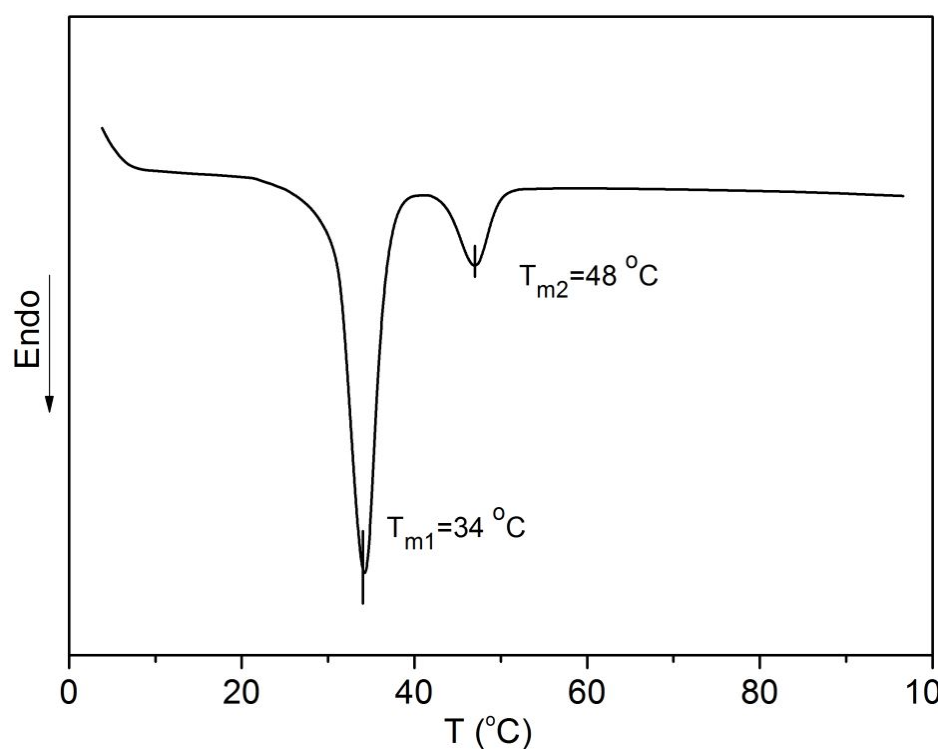


Figure S6. DSC thermogram of PDO (Sample 6 in Table 1).

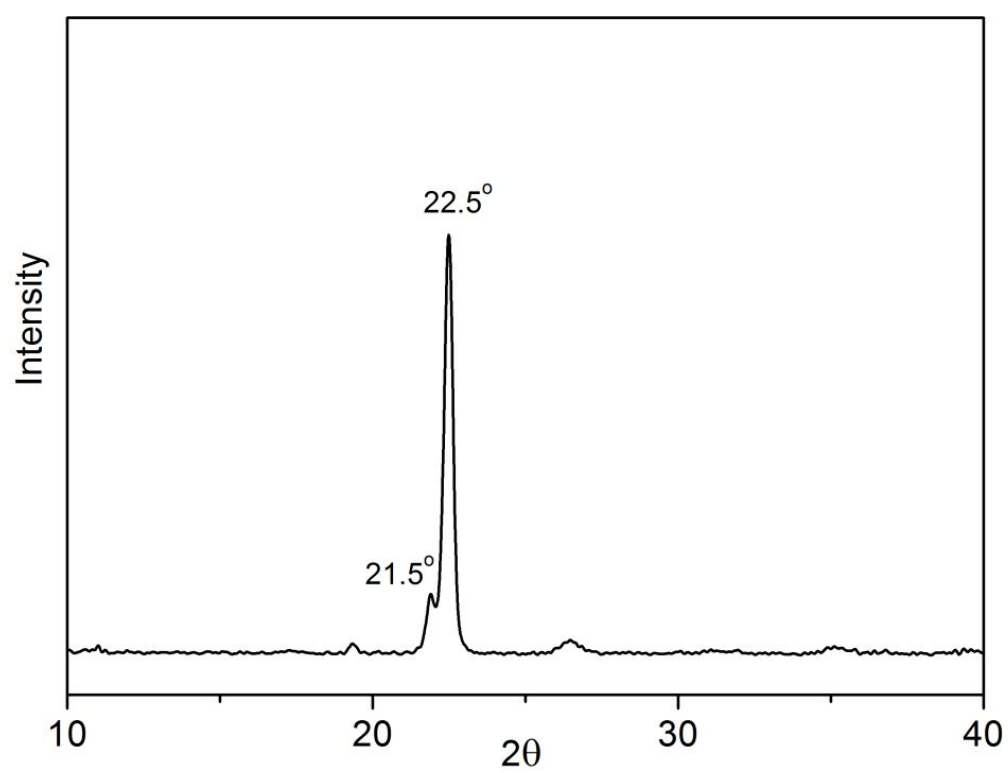


Figure S7. X-ray diffraction pattern of PDO (Sample 6 in Table 1).

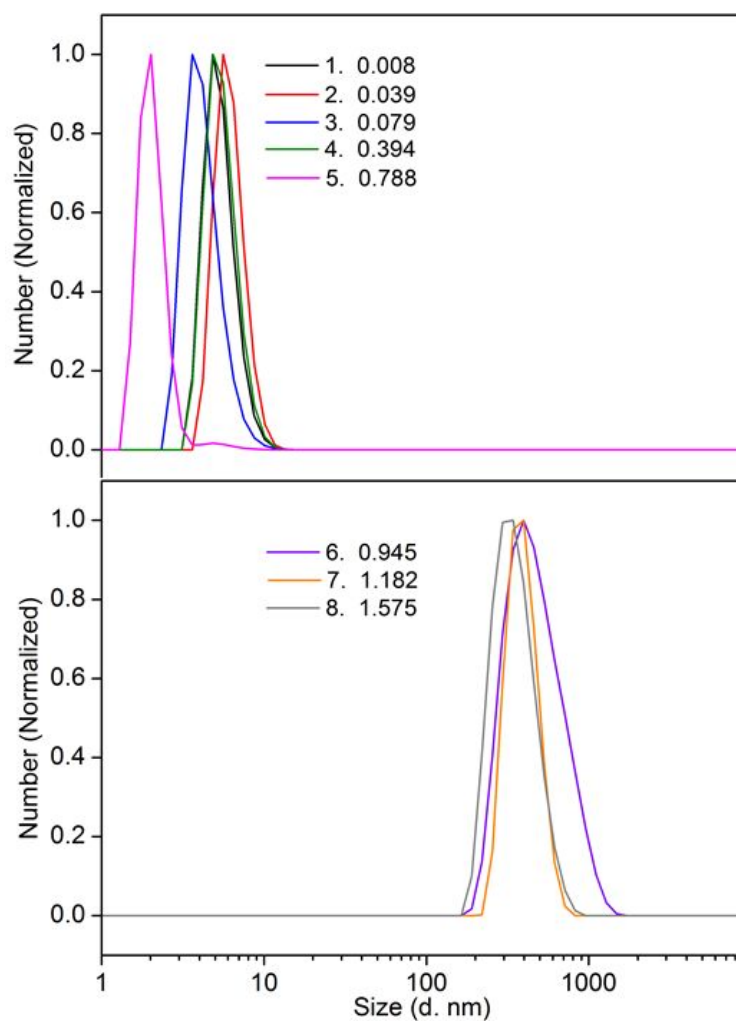


Figure S8. DLS CONTIN plots of PDO nanoparticles (Sample 6 in Table 1) with KOTf at different molar ratios (KOTf / units of DO) ranging from 0.008 to 1.575.

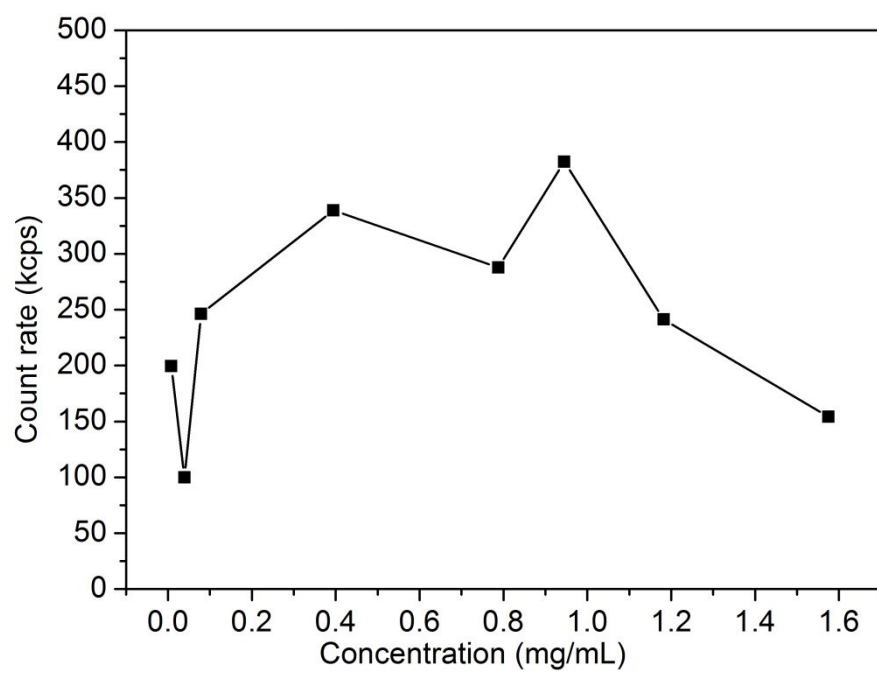


Figure S9. DLS count rates as a function of molar ratios (KOTf / units of DO).

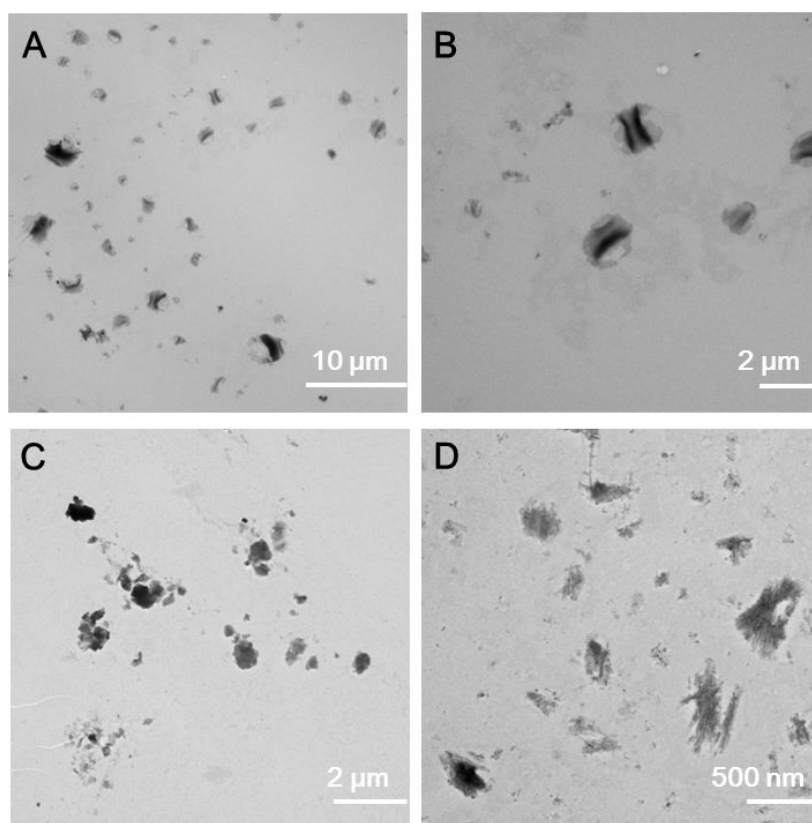


Figure S10. TEM micrographs of PDO nanoparticles (Sample 6 in Table 1, 5 mg/mL) in water at different molar ratios (KOTf/ units of DO): (A&B) 0.945, (C) 0.394, (D) 1.575.

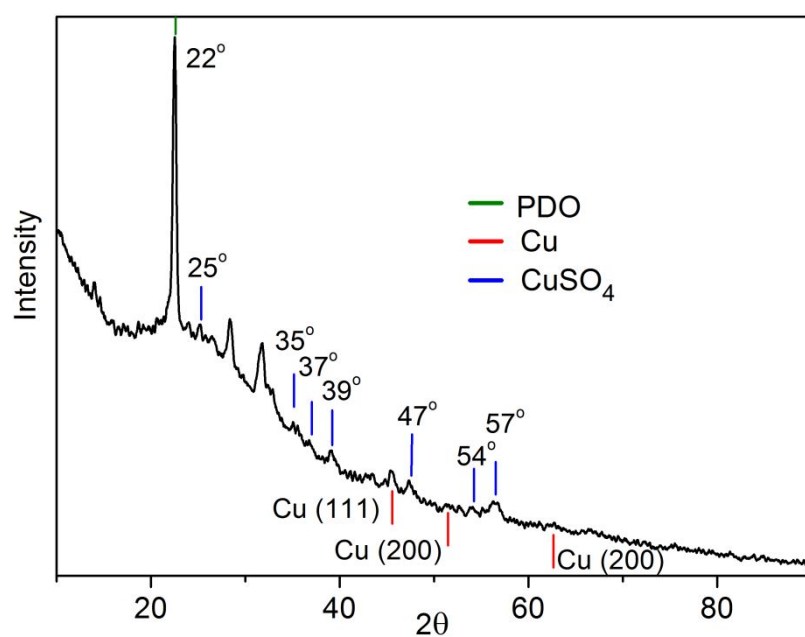


Figure S11. X-ray diffraction pattern of Cu/PDO/CuSO₄ compound (Olive, blue and red labels represent diffractions assigned to PDO, Cu and CuSO₄, respectively).

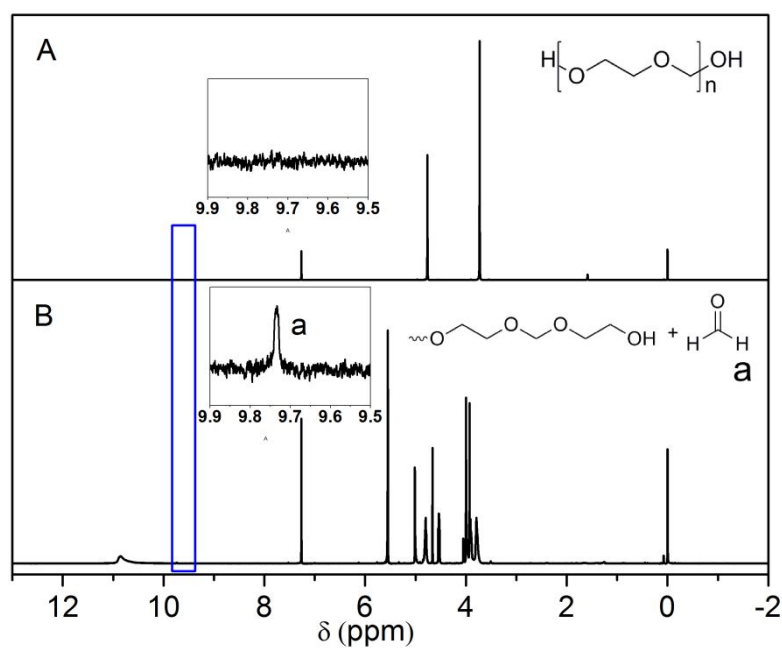


Figure S12. ^1H NMR spectra of PDO (Sample 6 in Table 1) without TFA treatment (A) and with TFA treatment (B), including the enlarged signals of methyl aldehyde after degradation in CDCl_3 .

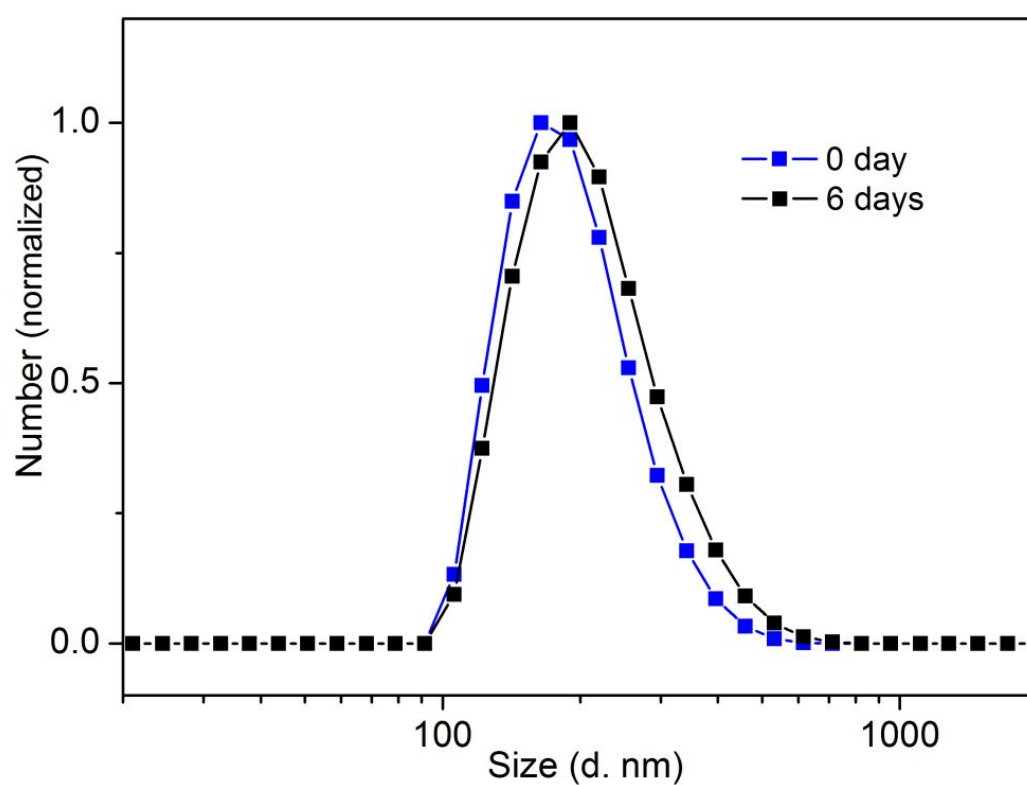


Figure S13. DLS size distribution histograms of nanoparticles self-assembled by PDO (Sample 6 in Table 1) in pH 6.8 buffer solution at 0.5 mg/mL 25 °C within 0 and 6 days.

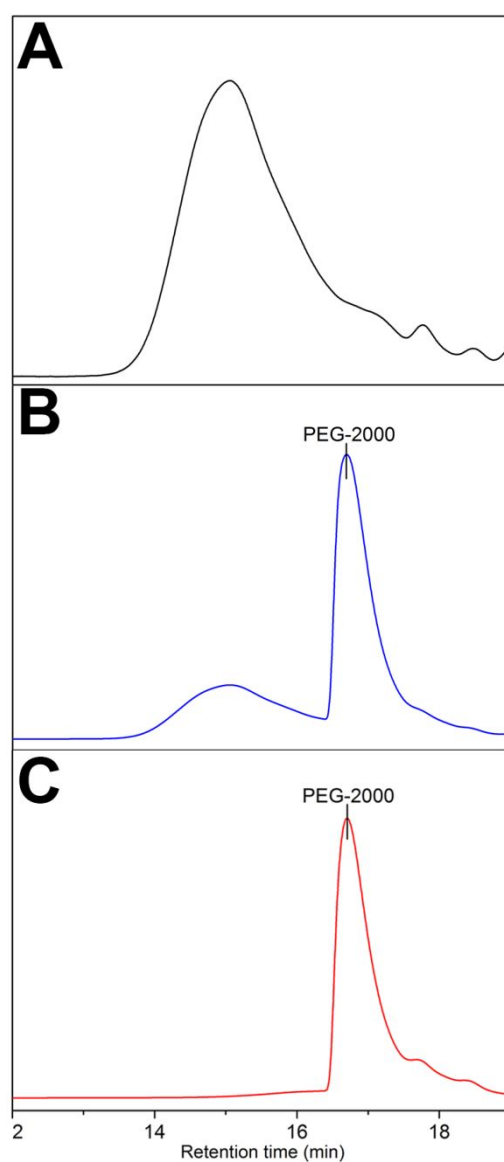


Figure S14. SEC elution traces of PDO (Sample 8 in Table 1, A), PDO (Sample 8 in Table 1) in buffer solution of pH 6.8 within 6 days (B) and PDO (Sample 8 in Table 1) in buffer solution of pH 5.5 within 4 days (C). PEG-2000 is used as a standard.

References

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