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Supporting Information

Size Control Synthesis of Melanin-Like Polydopamine Nanoparticles by Tuning Radicals

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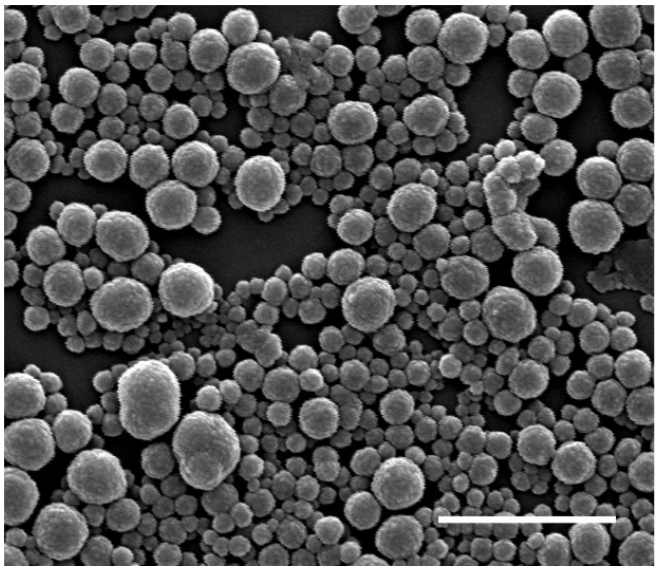

Fig. S1 Representative SEM image of PDA NPs obtained in the presence of edaravone (Edaravone: dopamine=1, mol/mol) (pH=9.55). Scale bar, 1 μm.

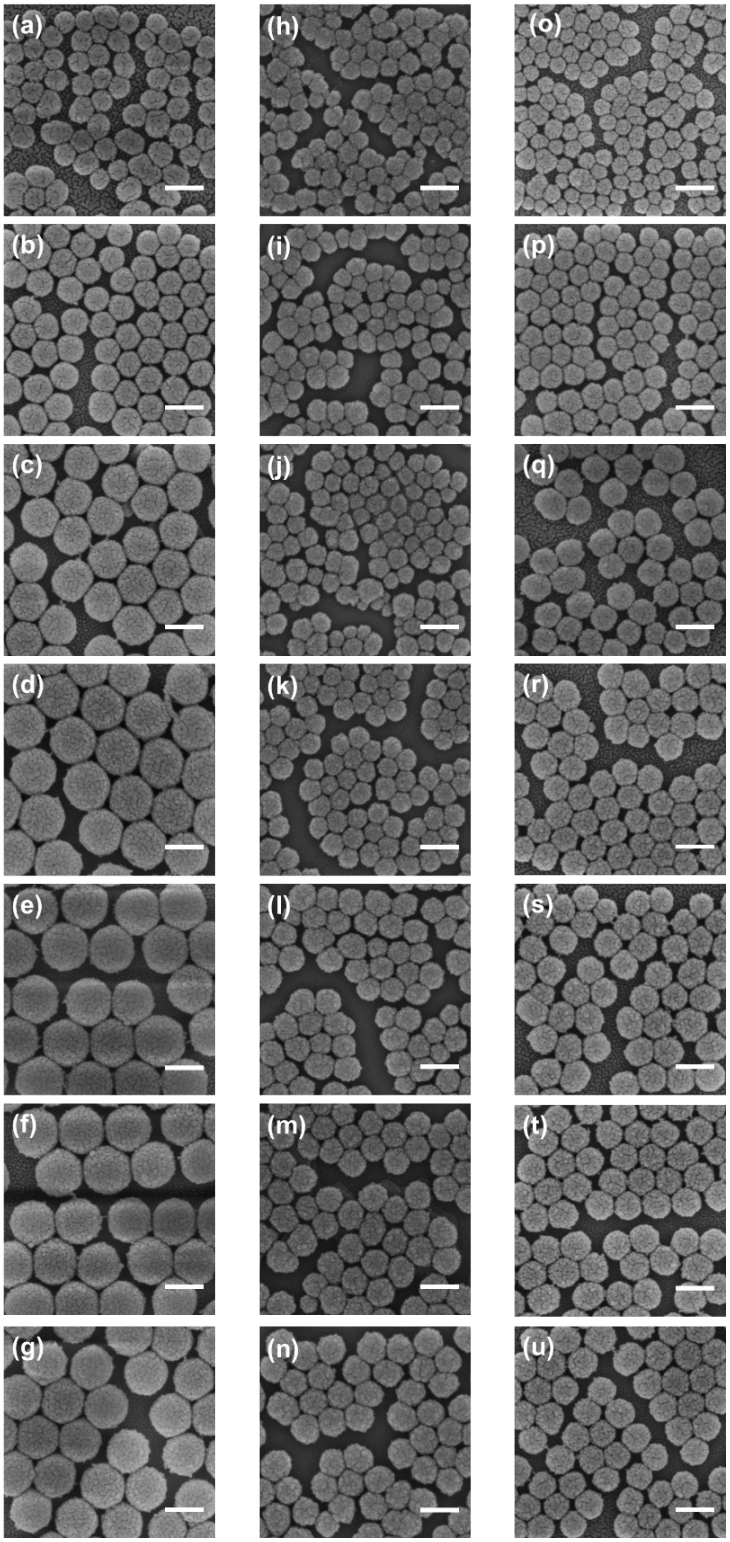

Fig. S2 Representative SEM images of PDA NPs obtained at 1h, 2h, 4h, 6h, 8h, 10h and 12h in sequence (a)~(g) in the absence of additive, (h)~(n) in the presence of edaravone (Edaravone: dopamine=0.2, mol/mol) and (o)~(u) in the presence of PTIO· (PTIO·: dopamine=0.2, mol/mol) (pH=9.87). Scale bar, 200 nm.

Table S1 Summary of physical parameters of PDA NPs obtained with different time at pH=9.87.

Molar Ratio*	Time (h)	Diameter from SEM (nm)	Diameter from DLS (nm)	PDI	Zeta Potential (mV)
0.00	1	120±13	203	0.138	-24.3
0.00	2	153±12	249	0.156	-26.3
0.00	4	201±12	302	0.158	-25.5
0.00	6	228±14	303	0.006	-25.9
0.00	8	240±13	311	0.108	-28.1
0.00	10	237±13	307	0.043	-26.8
0.00	12	230±14	318	0.073	-25.1
0.20E	1	94±11	169	0.112	-20.6
0.20E	2	101±15	196	0.044	-30.9
0.20E	4	109±11	224	0.033	-29.4
0.20E	6	123±10	229	0.074	-36.2
0.20E	8	126±9	240	0.067	-29.1
0.20E	10	132±16	248	0.029	-30.9
0.20E	12	139±11	239	0.049	-30.7
0.20P	1	89±12	181	0.064	-26.3
0.20P	2	115±16	215	0.032	-28.8
0.20P	4	143±13	236	0.002	-22.8
0.20P	6	144±16	240	0.127	-20.8
0.20P	8	156±20	246	0.111	-22.8
0.20P	10	149±13	235	0.052	-27.8
0.20P	12	144±19	238	0.128	-28.9

* E=Edaravone: dopamine, mol/mol; P=PTIO·: dopamine, mol/mol.

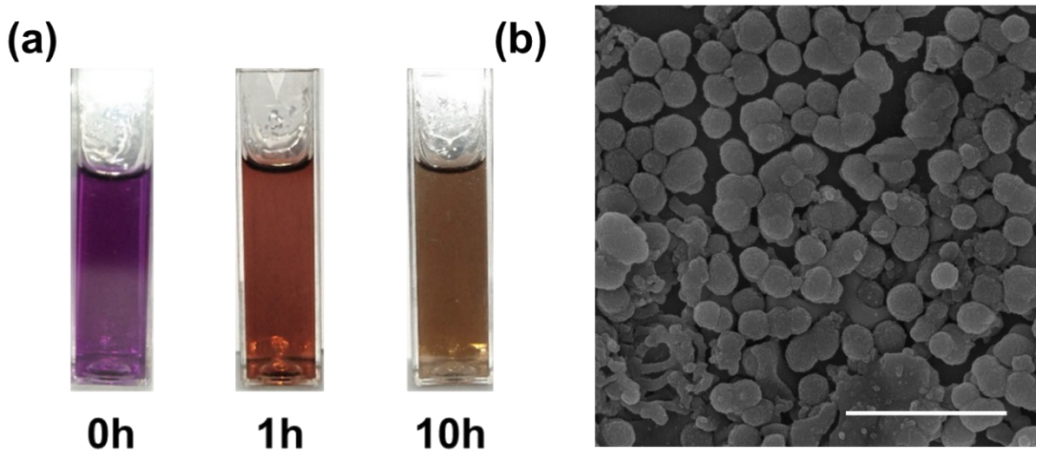

Fig. S3 (a)The color change of the reaction solution in the presence of PTIO· (PTIO·: dopamine=0.1, mol/mol) without basic catalysis; (b) The SEM imagine of the product obtained after 10 hours of reaction, scale bar, 1 μm.

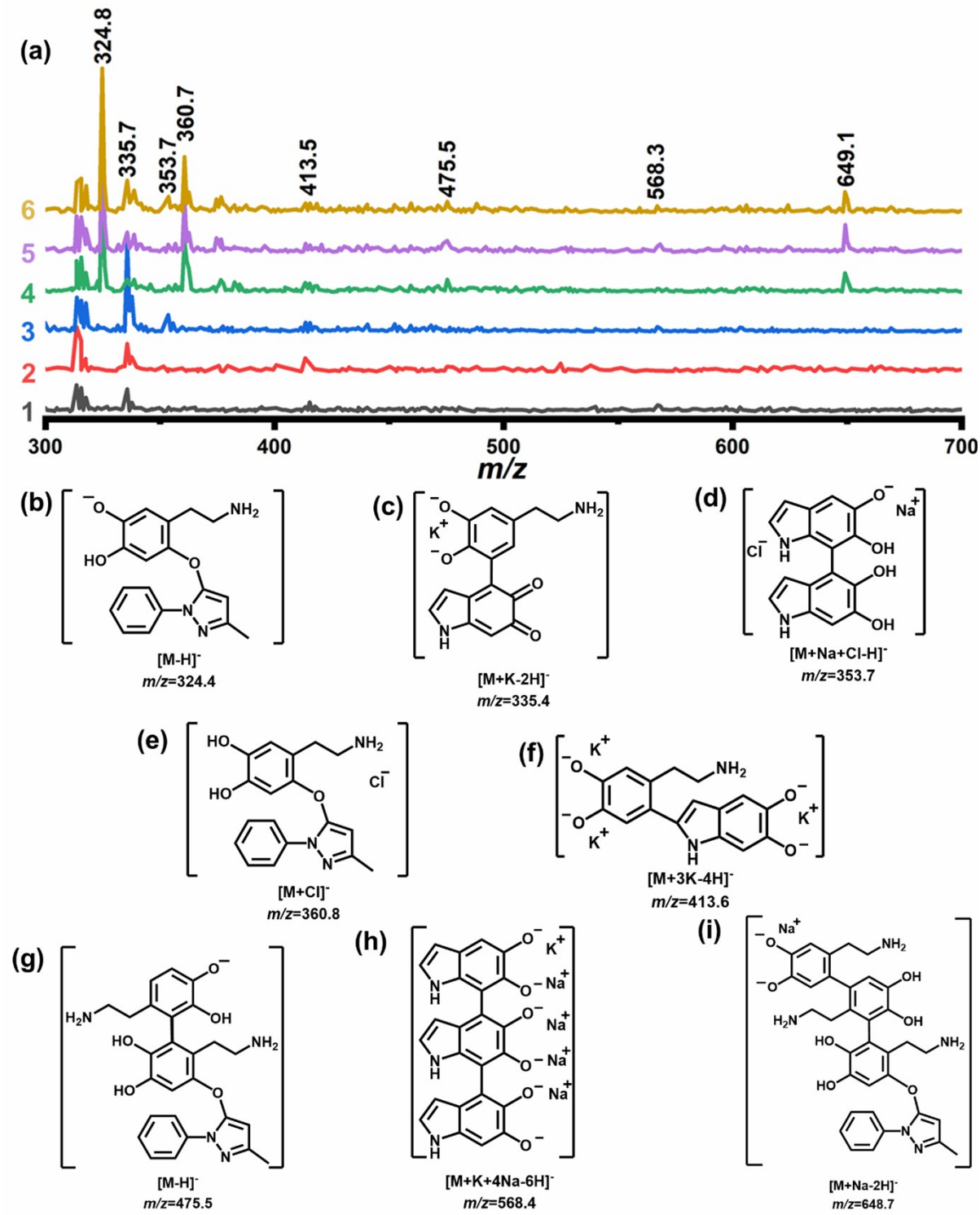

Fig. S4 (a)ESI-MS spectra of the reaction solutions in the absence or presence of edaravone (Edaravone: dopamine=0.05, mol/mol) (pH=9.87). "1", "2" and "3" corresponding to the reaction without edaravone after 1h, 2h and 4h reaction, respectively; and "4", "5" and "6" corresponding to the reaction with edaravone after1h, 2h and 4h reaction, respectively; (b)~(i)the possible structures assigned to main peaks.

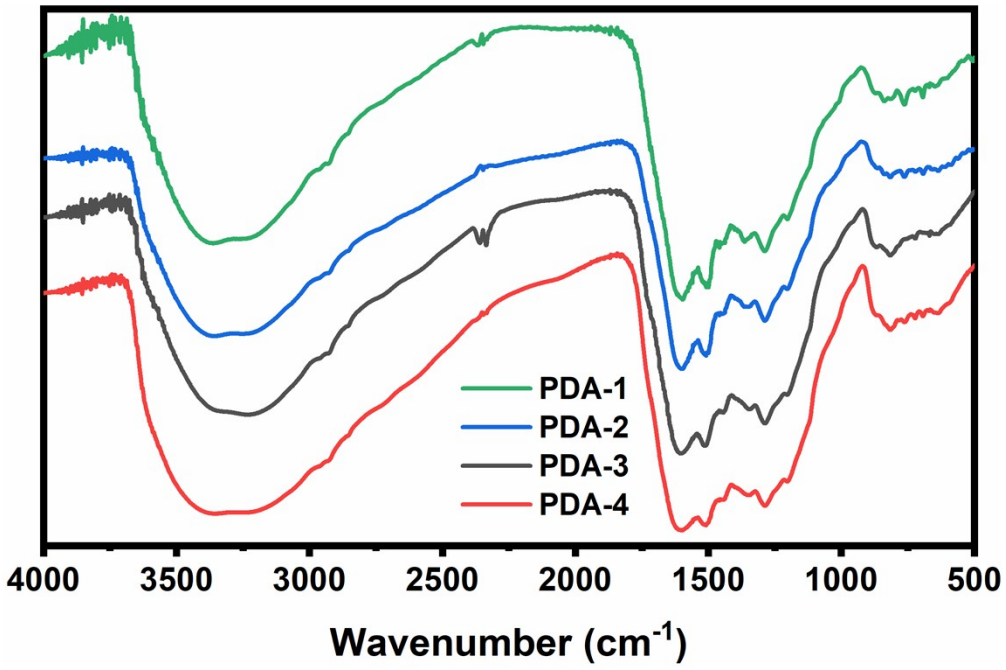

Fig. S5 FTIR spectra of PDA-i NPs (i=1-4).

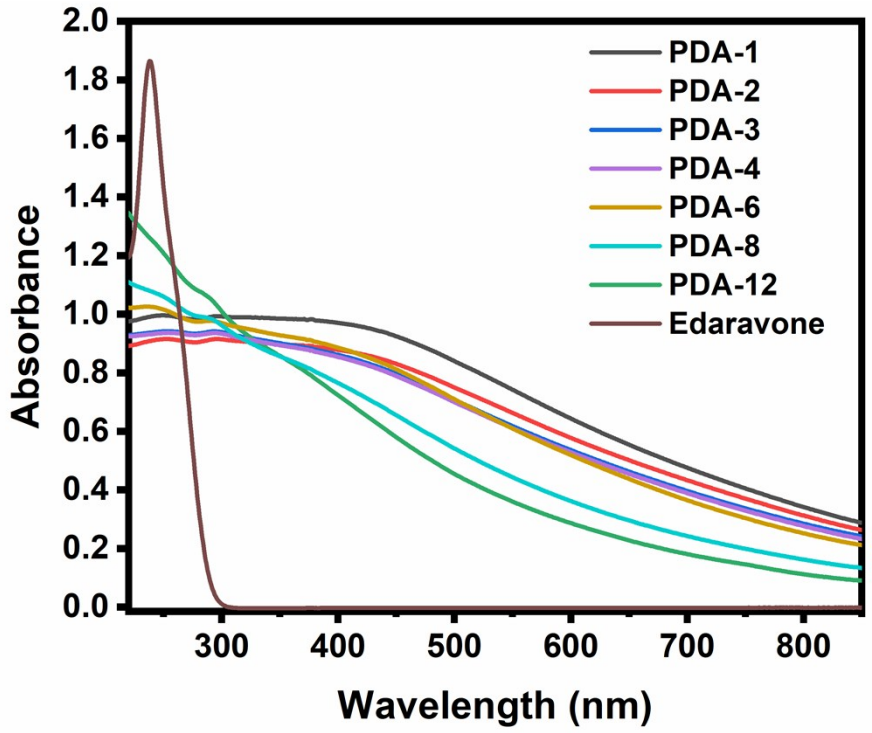

Fig. S6 UV-vis spectra of edaravone and PDA-i NPs (i=1-4, 6, 8, 12), with the same concentration of 30 μg/mL.

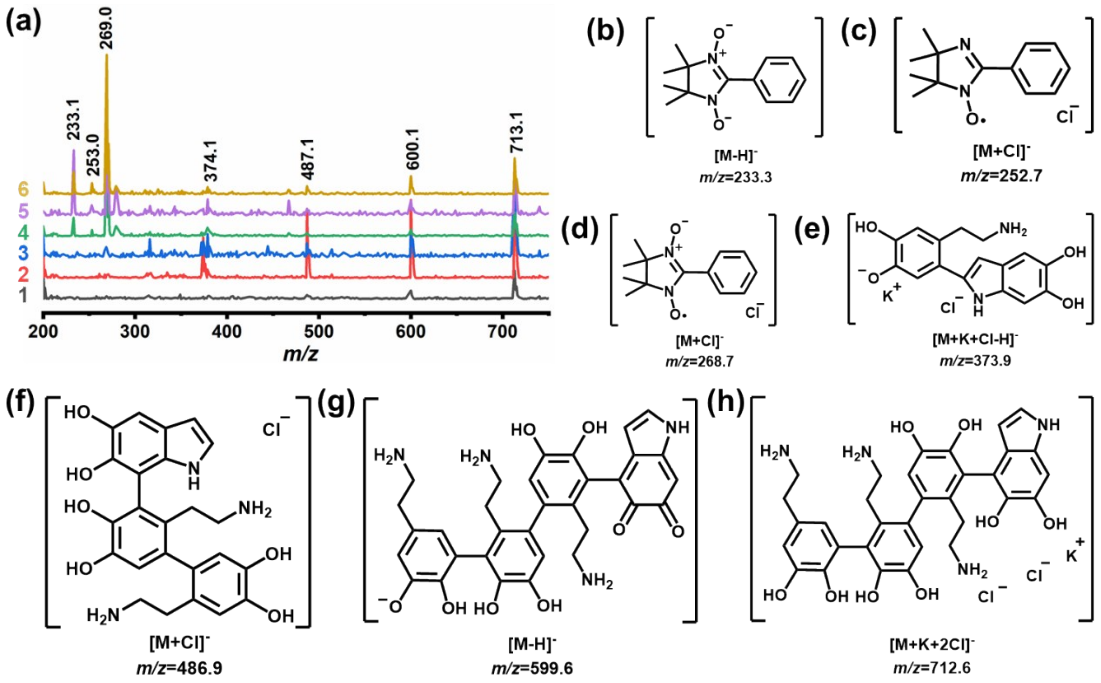

Fig. S7 ESI-MS spectra of the crude PDA reaction solutions in the absence or presence of PTIO· (PTIO·: dopamine=0.5, mol/mol) (pH=9.87) (a) "1", "2" and "3" corresponding to the reaction without PTIO· after 1h, 2h and 4h reaction, respectively, while "4", "5" and "6" corresponding to the reaction with PTIO· after 1h, 2h and 4h reaction, respectively; (b)~(d) the possible derivatives of PTIO·; and (e)~(h)the possible structures assigned to main peaks.

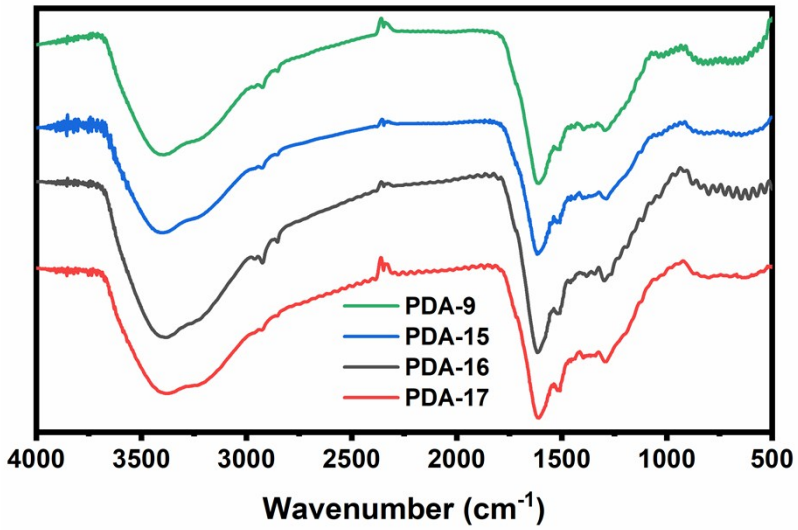

Fig. S8 FTIR spectra of PDA-i NPs (i=9, 15, 16, 17).

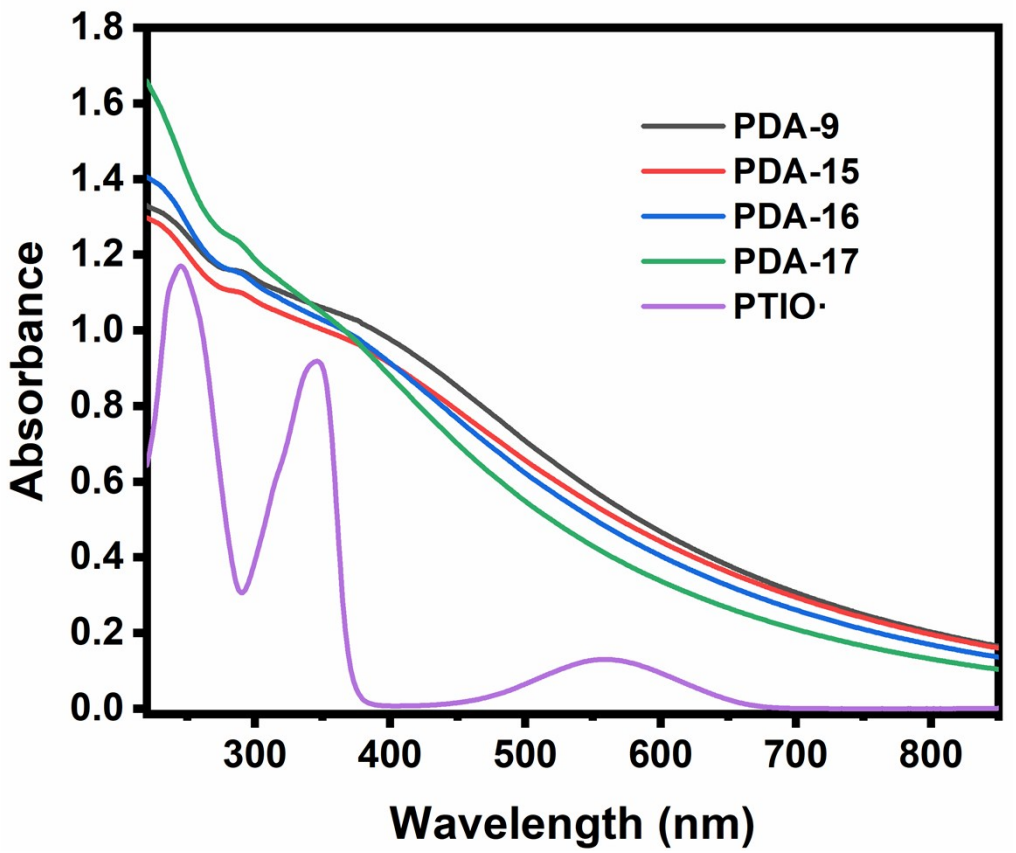

Fig. S9 UV-vis spectra of PTIO· and PDA-i NPs (i=9, 15, 16, 17), with the same concentration of 30 μg/mL.

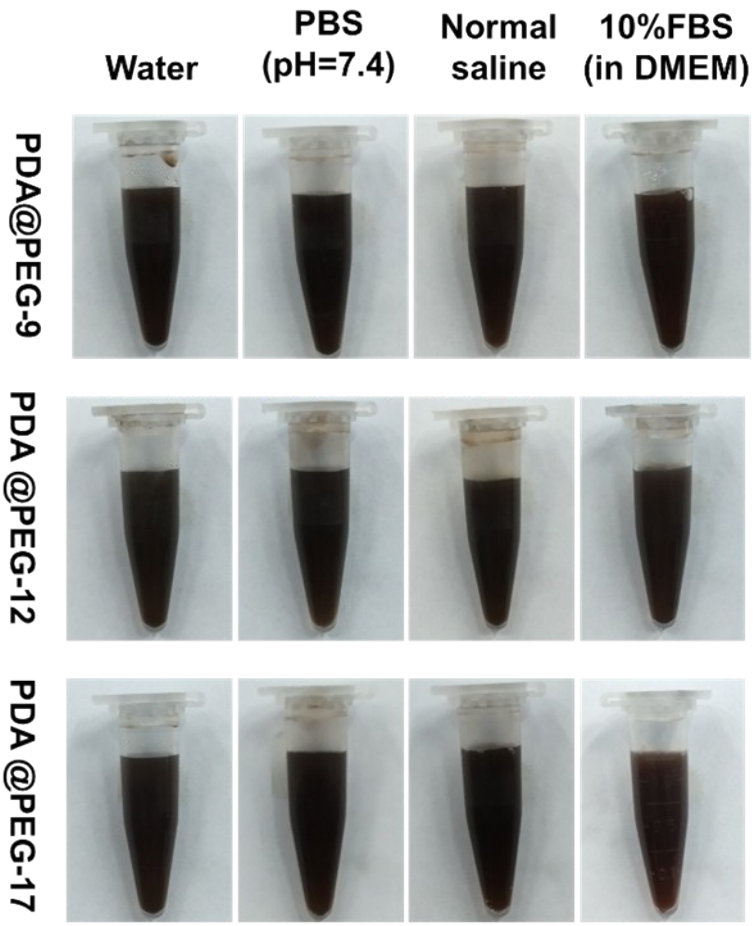

Fig. S10 Dispersion stability of PEG-modified PDA-i NPs (i=9, 12, 17) in water, PBS (pH=7.4), normal saline and DMEM supplemented with 10% FBS (v/v). Nanoparticle concentration is 0.4 mg/mL and the optical photos were taken after a natural rest of 24 hours.