Supplementary Information for

Polydopamine generates hydroxyl free-radical under UV-light irradiation

*Zehuan Wang, Feng Tang, Hailong Fan, Le Wang, Zhaoxia Jin**

Department of Chemistry, Renmin University of China, Beijing, 100872,

People's Republic of China

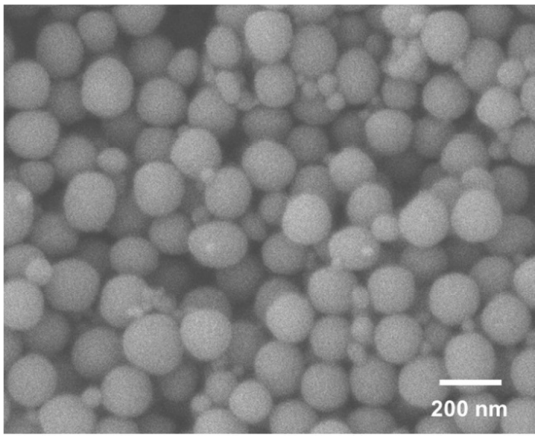

Figure S1. SEM image of PDA SPs.

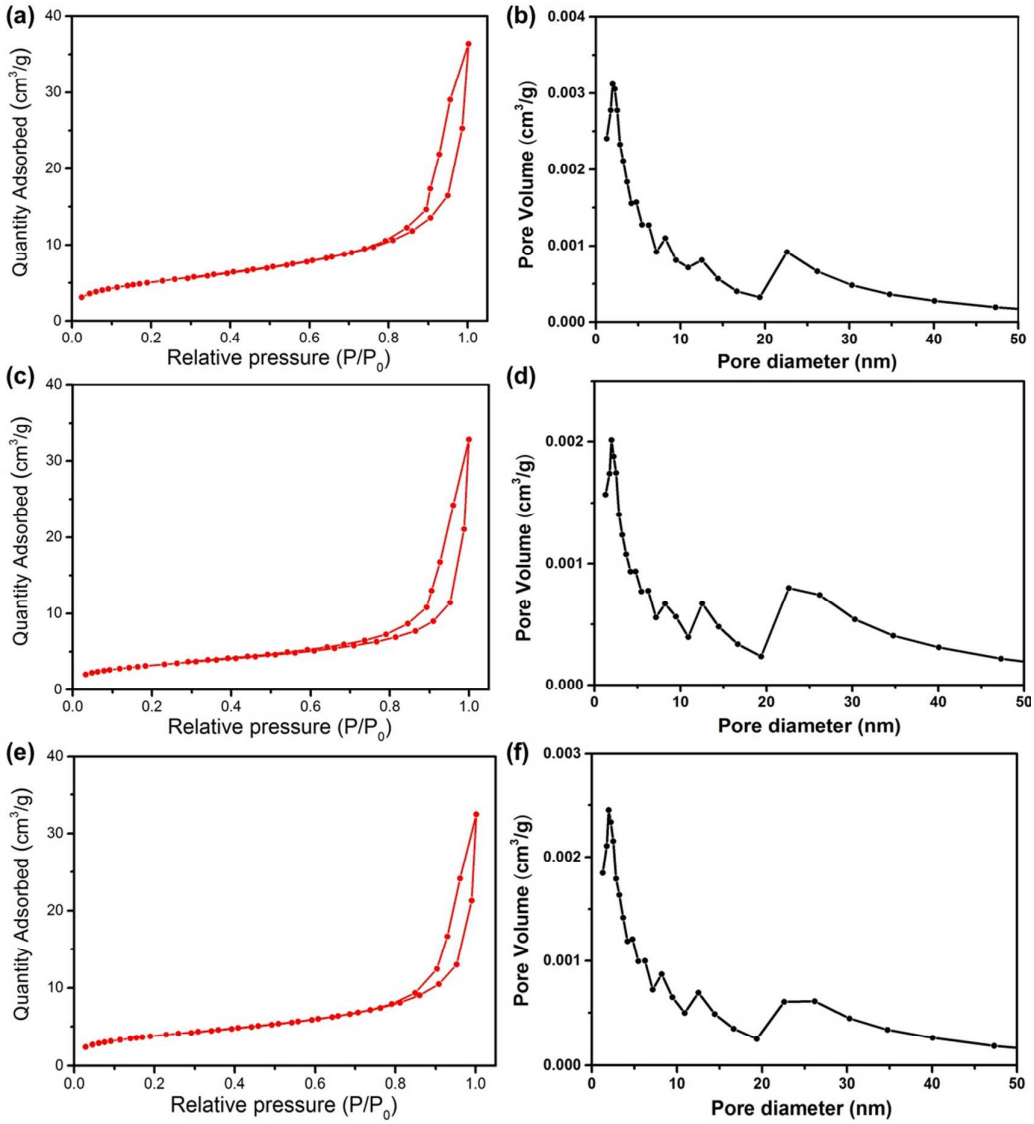

Figure S2. (a) N_2 adsorption–desorption isotherm of PDA NTs. (b) The BJH corresponding pore size distribution curve of PDA NTs. (c) N_2 adsorption–desorption isotherm of PDA LPs. (d) The BJH corresponding pore size distribution curve of PDA LPs. (e) N_2 adsorption–desorption isotherm of PDA SPs. (f) The BJH corresponding pore size distribution curve of PDA SPs.

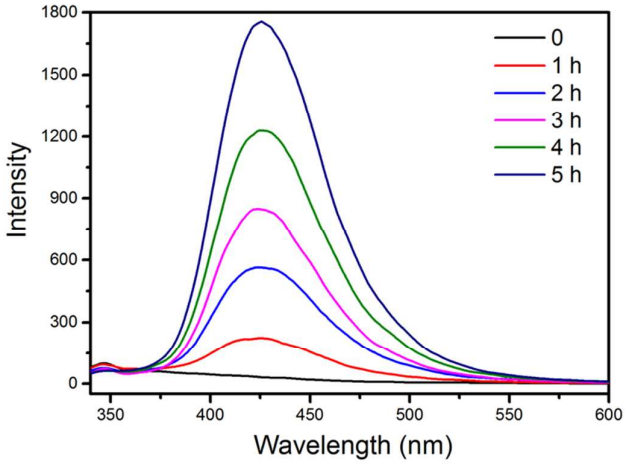

Figure S3. Fluorescence spectra of HTA in the presence of UV-illuminated PDA SPs (15 mg in 85 mL water, *Ex* = 315 nm, *Em* = 425 nm).

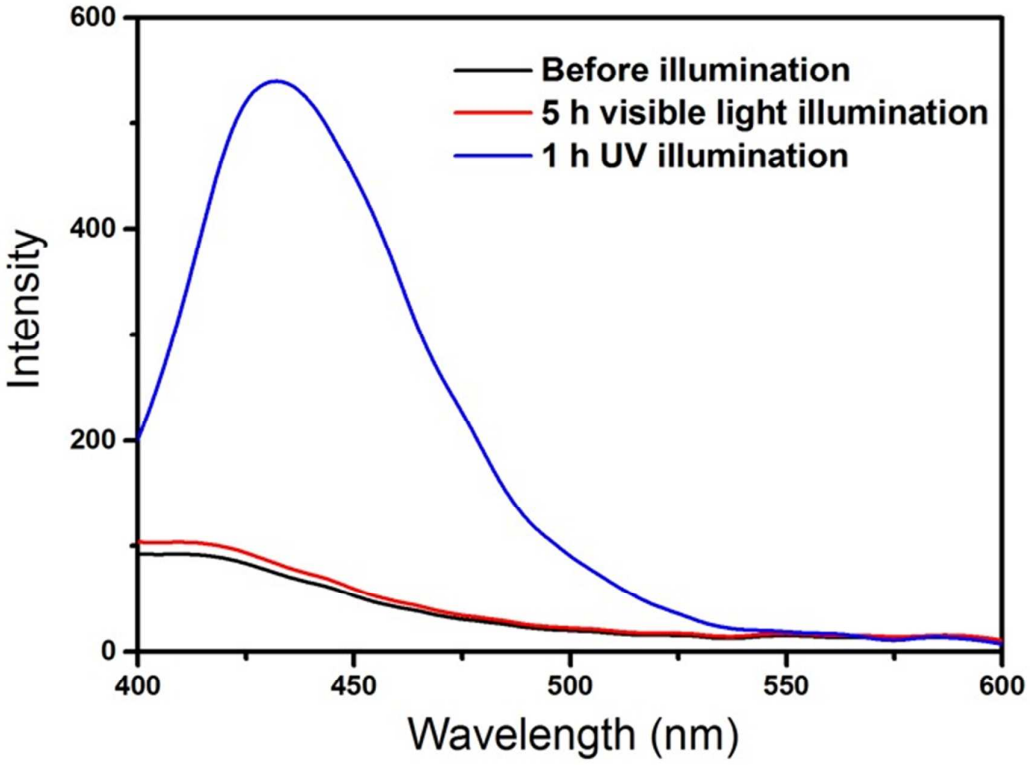

Figure S4. Fluorescence spectra of HTA in the presence of PDA LPs (15 mg in 85 mL water, *Ex* = 315 nm, *Em* = 425 nm) before illumination, 5 h visible light illumination and 1 h UV illumination.

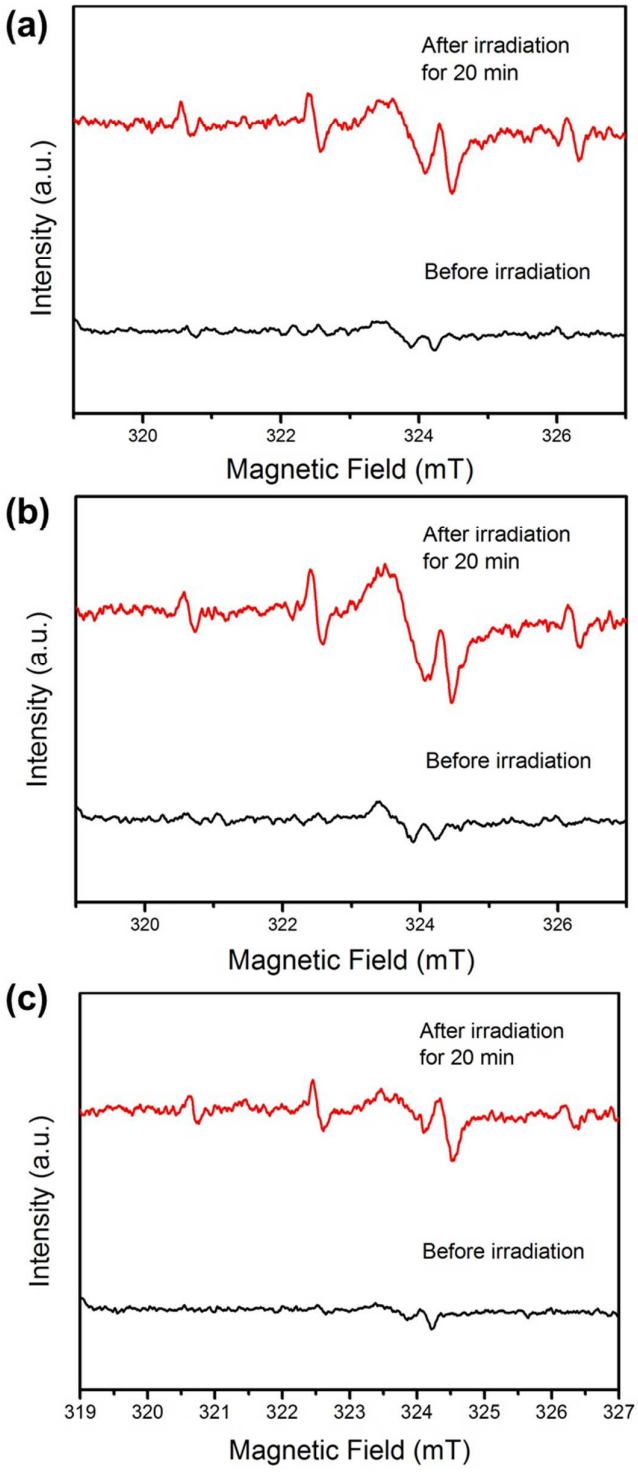

Figure S5. ESR signals of DMPO-OH spin adducts in the solution of (a) 1 mg/mL PDA NTs solution before and after UV irradiation, (b) 1 mg/mL PDA LPs solution before and after UV irradiation, (c) 1 mg/mL PDA SPs solution before and after UV irradiation.

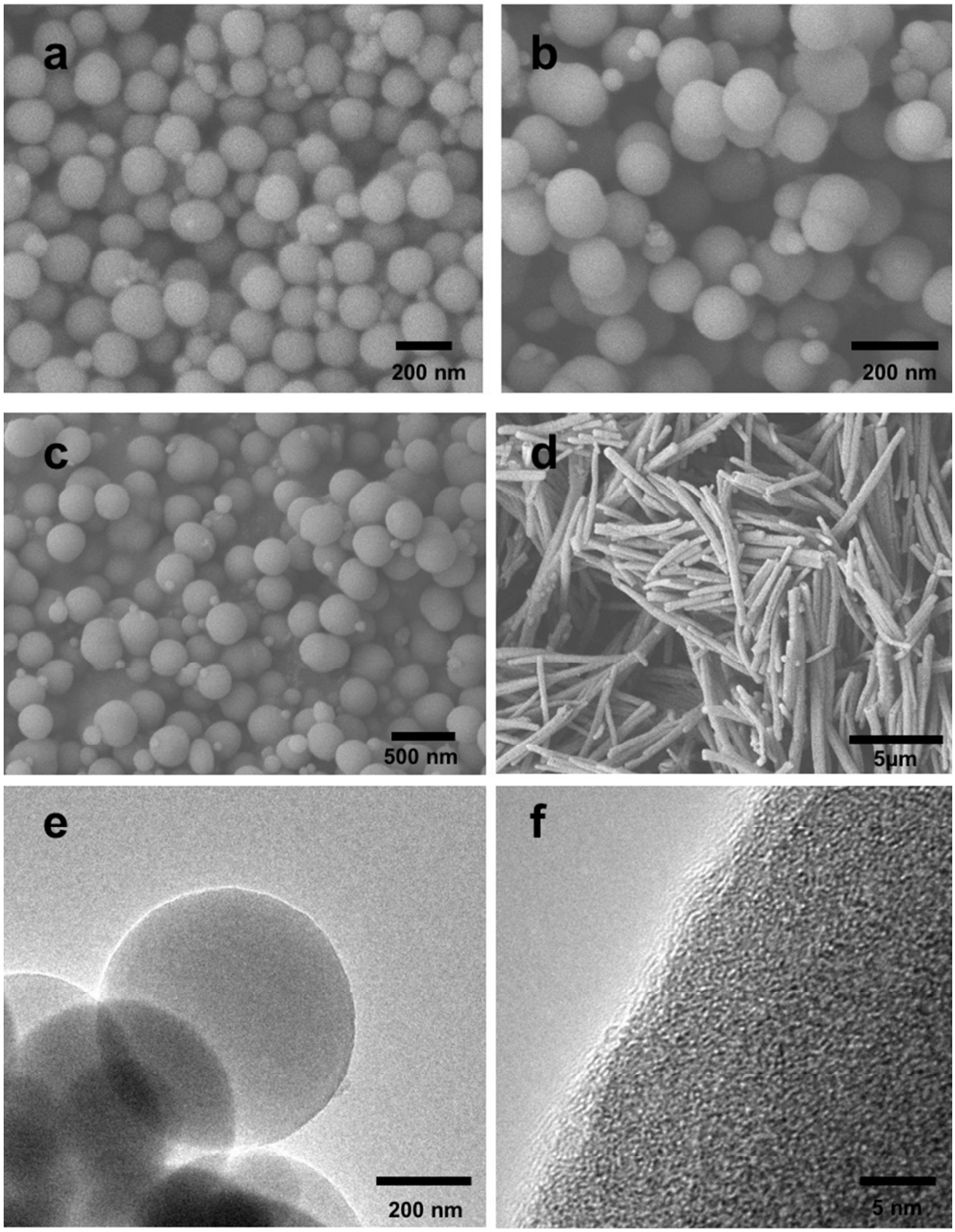

Figure S6. (a) SEM image of original PDA SPs. (b) SEM image of UV-irradiated PDA SPs. (c) SEM image of UV-irradiated PDA LPs. (d) SEM image of UV-irradiated PDA NTs. (e) TEM image of UV-irradiated PDA LPs. (f) HRTEM image of UV-irradiated PDA LPs.

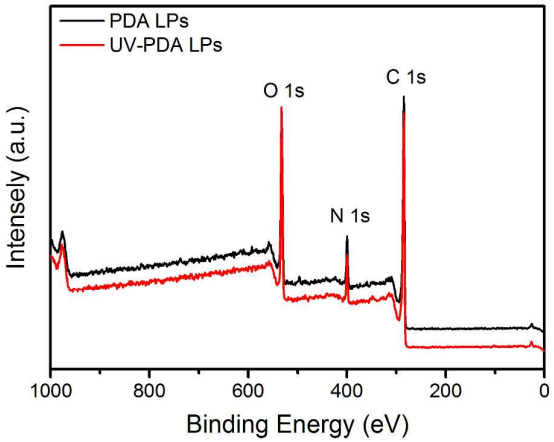

Figure S7. XPS spectra of PDA LPs and UV-illuminated PDA LPs.

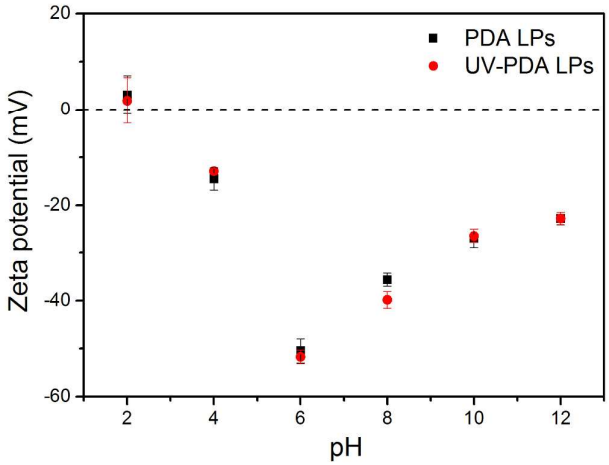

Figure S8. Zeta potential of PDA LPs and UV-irradiated PDA LPs.

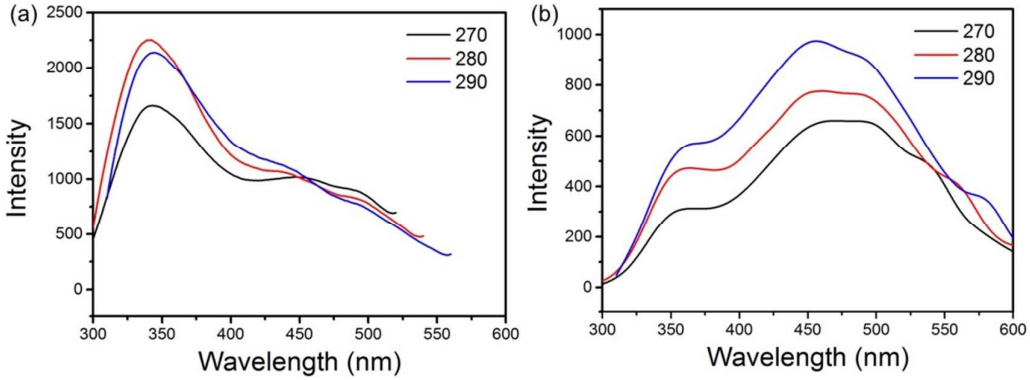

Figure S9. Fluorescence spectra of (a) UV-illuminated (5 h) PDA LPs solution, (b) D-PDA LPs solution upon excitation at 270 nm, 280 nm and 290 nm.

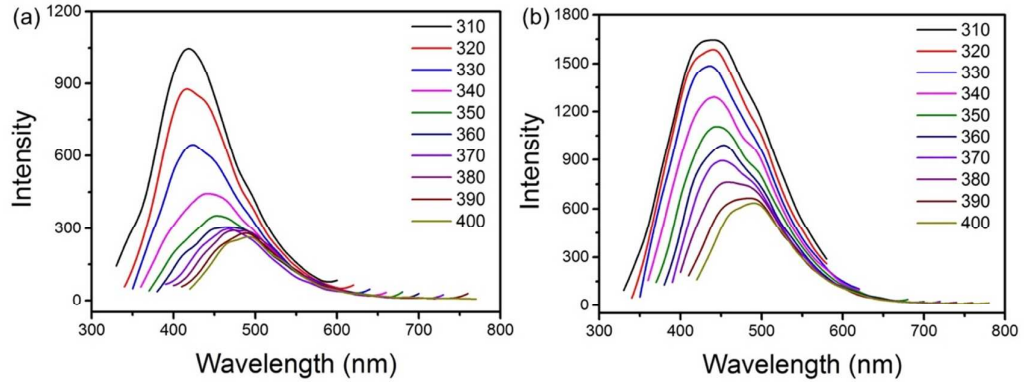

Figure S10. Fluorescence spectra of (a) UV-illuminated (5 h) PDA NTs solution, (b) D- PDA NTs solution.

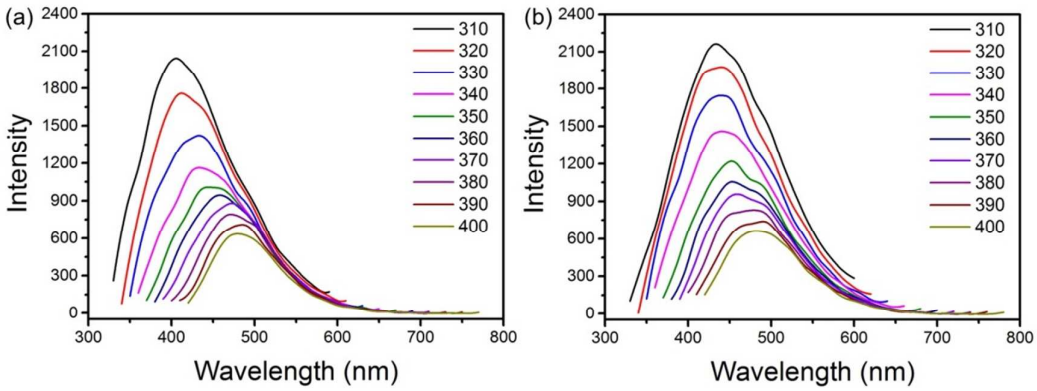

Figure S11. Fluorescence spectra of (a) UV-illuminated (5 h) PDA SPs solution, (b) D- PDA SPs solution.

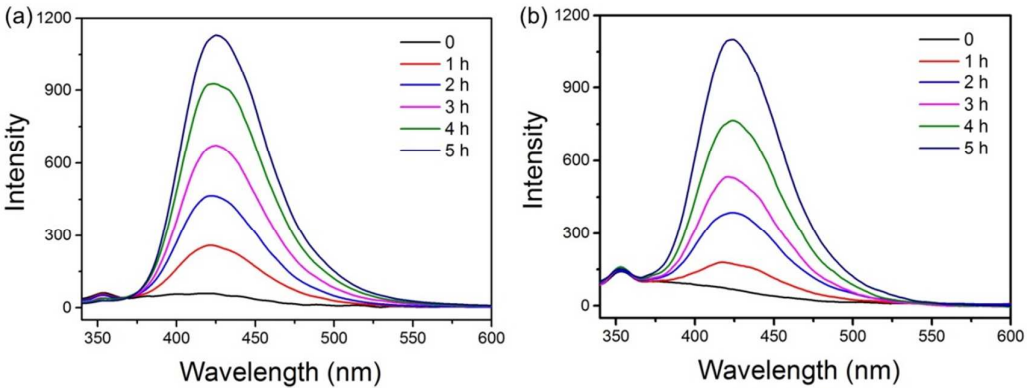

Figure S12. Fluorescence spectra of HTA in the presence of (a) D-PDA LPs and (b) D-PDA NTs under UV-light irradiation from 1h to 5h.

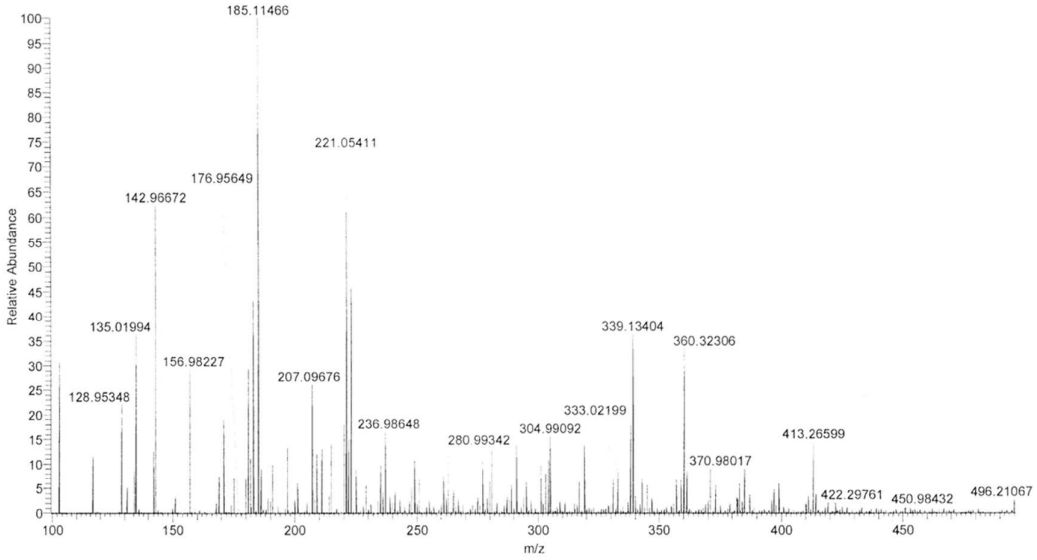

Figure S13. ESI-TOF mass spectrum of D-PDA NTs. Peaks at m/z~185 and 360 originate from internal labeling substances.

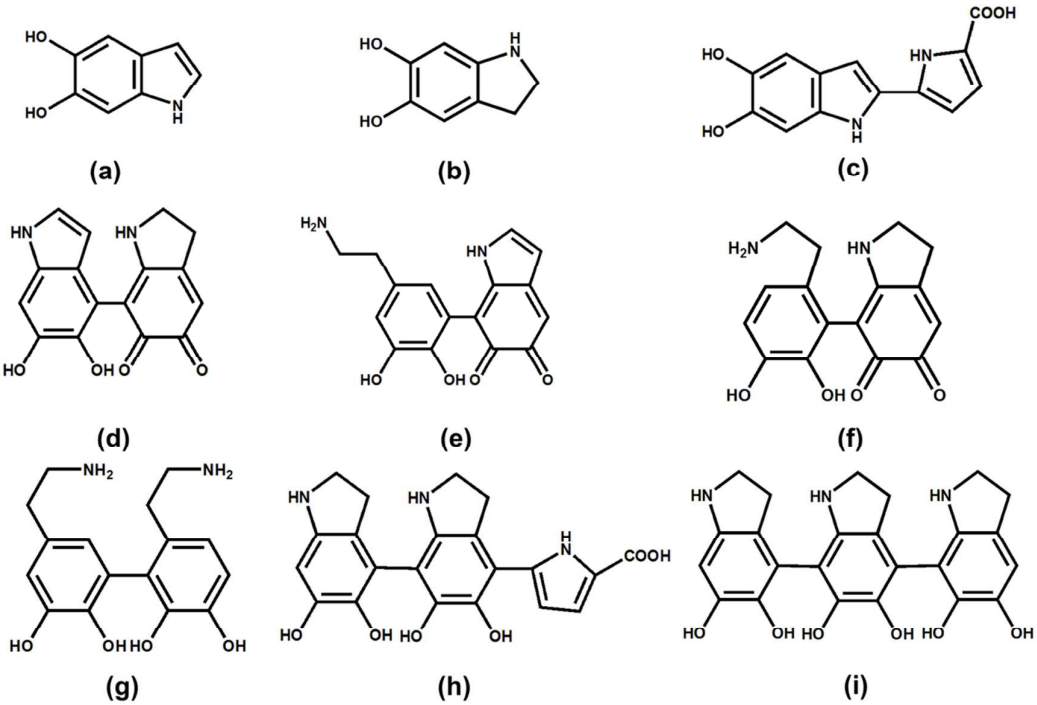

Figure S14. Possible oligomer structures of UV PDA nanomaterials or D-PDA.

Table S1 BET specific surface areas of PDA nanostructures.

Sample name	BET (m^2g^{-1})	Total pore volume （cm^3g^{-1}）	Mean pore diameter (nm)
PDA NTs	17.967	0.043332	9.64
PDA LPs	11.315	0.036549	12.92
PDA SPs	13.194	0.03297	11.99

Table S2. Assigned peaks in ESI-TOF MS of five samples.

	m/z peak	calculated mass	Proposed oligomers
UV PDA NTs	173.028	173.044	a+Na+H
	301.141	301.111	f+H
	413.266	413.227	h+4H
	496.209	496.146	i+2Na+H
UV PDA LPs	166.086	166.051	a+OH
	255.164	258.229	c-3H
	274.274	274.229	c+OH
	318.300	318.070	d+Na-H
	338.342	338.399	e+K+H
UV PDA SPs	166.086	166.051	a+OH
	195.186	195.126	a+2Na
	304.261	304.341	g
	338.342	338.399	e+K+H
	413.266	413.227	h+4H
D-PDA LPs	221.054	221.040	b+3Na+H
	319.006	319.070	d+Na
	339.134	339.399	e+K+2H
D-PDA NTs	221.054	221.040	b+3Na+H
	339.134	339.399	e+K+2H
	413.266	413.227	h+4H