

Support Information

Chemicals Tetraethyl orthosilicate (TEOS), 1,3,5-trimethylbenzene (TMB), pyrene (PY), *o*-diaminobenzene (DAB), 1,10-phenanthroline (PHA), NaOH, HNO₃, Na₂CO₃ were purchased from Shanghai Sinopharm Chemical Reagent Company. Poly (ethylene oxide)-*block*-poly(propylene oxide)-*block*-poly(ethylene oxide) triblock copolymer Pluronic P123 ($M_w = 5800$, EO₂₀PO₇₀EO₂₀) and diamine-terminated oligomeric polymeric poly (ethylene glycol), H₂NCH₂(CH₂CH₂O)_nCH₂CH₂CH₂NH₂ (average $n \sim 35$, PEG_{1500N}) were purchased from Sigma-Aldrich. All chemicals were used as received without any further purification. Ultrapure water (18.2 MΩ·cm @25 °C) was used in all experiments.

TEM characterization TEM measurements were performed on JEM-2010F at operating voltage of 200 kV. The sample was diluted in ultrapure water and the suspension dropped on carbon-coated copper grid by evaporation in air.

AFM characterization 1 μL aqueous solution of CD was spotted onto freshly cleaved mica surface and dried in air (~ 20 minutes). The samples were imaged in air by tapping mode AFM on Nanonavi E-Sweep (SII).

Elemental analysis The elemental analysis was measured on PE 2400 II made by Perkin Elmer Company in America.

UV/Vis spectroscopy UV/Vis spectra were recorded at room temperature on a Hitachi J-4100 spectrophotometer.

Fluorescence spectroscopy Fluorescence spectra were recorded on a Horiba Fluoromax-4 spectrometer.

XRD spectra X-ray diffraction patterns were taken with Bruker AXS D8 Advance X-ray diffraction instrument using Cu K α irradiation.



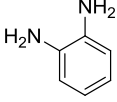

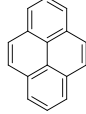

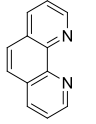

TG analysis The TG analysis was measured on STA409PC made by Netzsch Company in Germany.

Synthesis procedure for CDs

Typically, 2.0 g P123 was dissolved in a mixture of 1.6 M HCl aqueous solution (75 ml) by stirring at 40 °C until the aqueous turn to clear. Then 4.3 g TEOS was added

into the above solution. After stirring the solution for 65 minutes, white vaporific solution was obtained. After the quick filtration of the above mixture, the acquired white solid were added into the mixture of 1.0 g P123 and 75ml HCl (1.6 M) again. Consequently, 2.0 g organic precursors (TMB, DBA, PY, and PHA) were added into the mixture solution and stirred at 40 °C for 24 h. The hydrophobic interactions between the organic precursors and PPO parts of P123 enable the encapsulation of these molecules. Then the reaction mixture was moved to the hydrothermal reactor for hydrothermal treatment at 373 K for 24 h. The product were filtrated and washed, and then were dried under the air condition to prepare for the further calcinations. The product gained from above process were calcinations at 900 °C for 2 h with a ramp rate of 2 °C/min under nitrogen. To release the carbon particles, CDs@OMS composites were etched with 2 M NaOH solution at 40 °C for 48 h to remove the silica template. The excessive NaOH was first neutralized by HNO₃ and then removed by dialyzing the suspension against Milli-Q water through a dialysis membrane (MWCO 3500). On the basis of the mass of four organic precursors, the yields for CD_{TMB}, CD_{DAB}, CD_{PY} and CD_{PHA} are 38.9%, 63.7%, 66.9% and 66.0%, respectively. In a control experiment, OMS-P123 without the addition of organic precursors was prepared. The TG analysis in air was applied to determine the carbon content of the product from OMS-P123 after the thermal treatment at 900 °C. While the TG curve indicated that it only lost weight less than 2% (Figure S8). And no obvious carbon particles could be found in the TEM and AFM images of the sample after the removal of silica template (not shown). These results confirm that the CDs are originated from the organic precursors and the copolymer was completely removed by thermal decomposition. The carbon nanoparticles were further surface functionalized with nitric acid at 120 °C for 24 h. Finally, the photoluminescent CDs were gained after passivating with PEG_{1500N} and dialysing for 12 h.

Table S1. Characteristic of CDs prepared by different organic molecules which served as carbon source.

	Precursors	Diameter (nm)	Structure	Elemental analyse before surface passivation (wt%)	Quantum yield	Optical photo under $\lambda_{360\text{nm}}$
CD _{TMB}		2.0-3.5	Amorphous	C 91.62 H 2.10	3.3%	
CD _{DAB}		2.5-3.5	Amorphous	C 90.91 H 2.86 N 1.33	4.1%	
CD _{PY}		3.0-4.5	Graphitic	C 96.16 H 1.85	4.7%	
CD _{PHA}		3.5-5.0	Graphitic	C 94.18 H 1.69 N 1.78	4.5%	

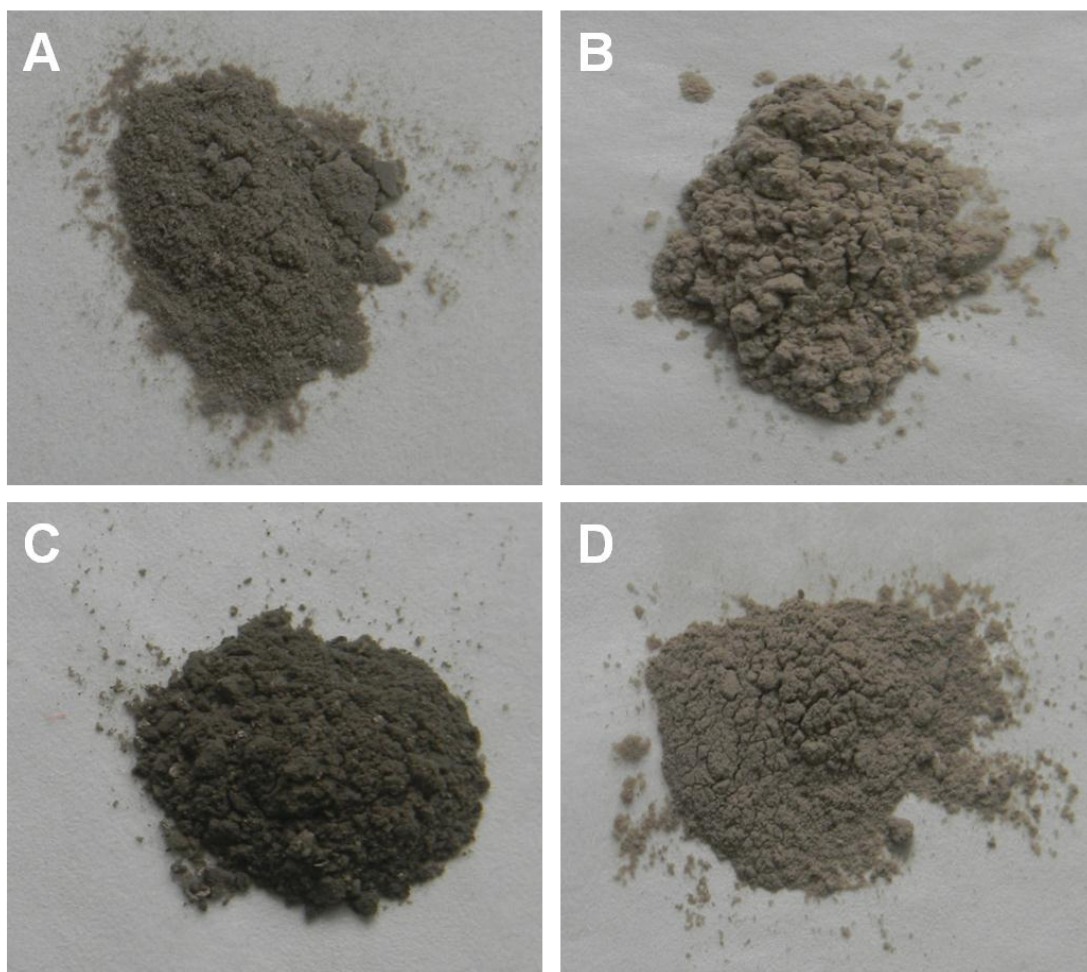


Figure S1. Optical pictures of the four kinds of CDs-containing order mesoporous silica after calcinations at 900 °C in N₂ (CDs@OMS). A) CD_{TMB}@OMS; B) CD_{DAB}@OMS; C) CD_{PY}@OMS; D) CD_{PHA}@OMS.

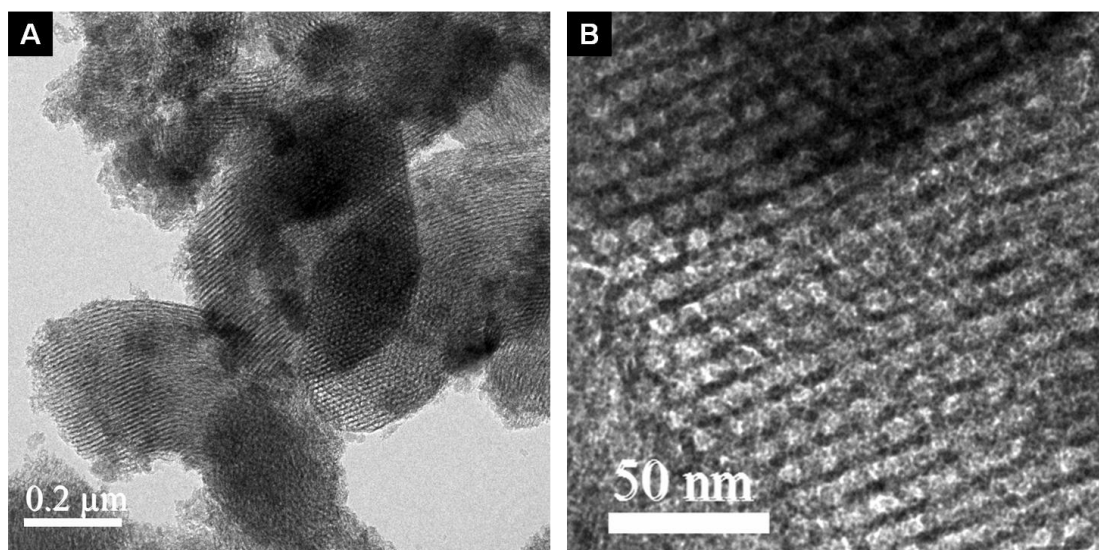


Figure S2. A) TEM image of CD_{TMB}@OMS; B) HRTEM image of CD_{TMB}@OMS.

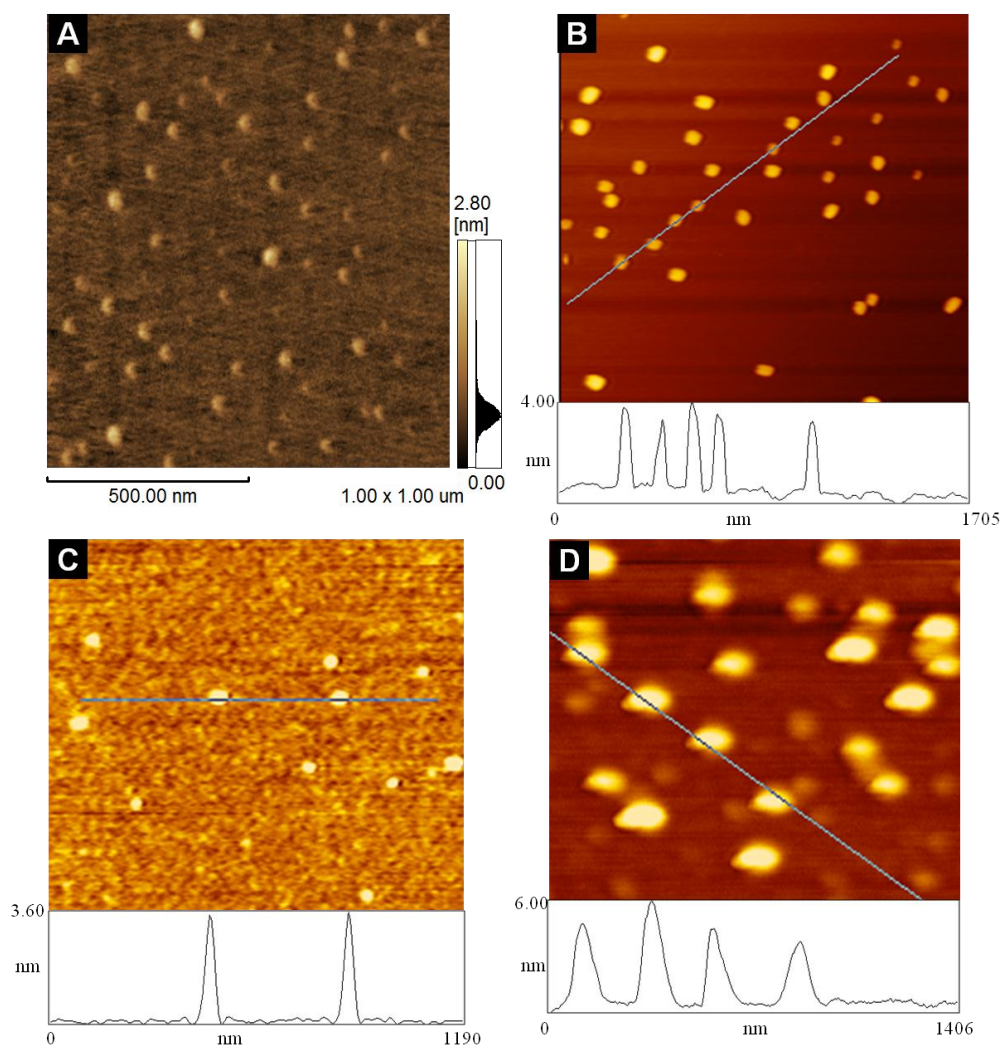


Figure S3. AFM images of the four kinds of CDs. A) CD_{TMB}; B) CD_{DAB}; C) CD_{PY}; D) CD_{PHA}.

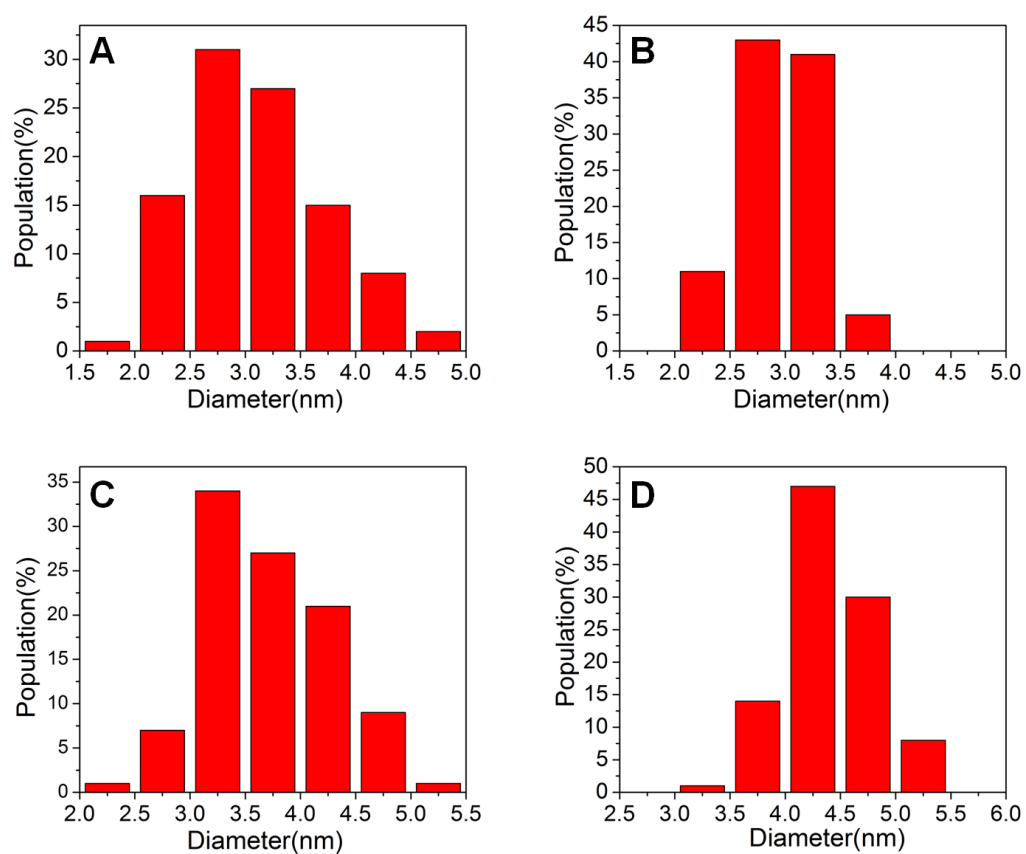


Figure S4. The particles size distribution histograms of the four kinds of CDs. A) CD_{TMB}; B) CD_{DAB}; C) CD_{PY}; D) CD_{PHA}.

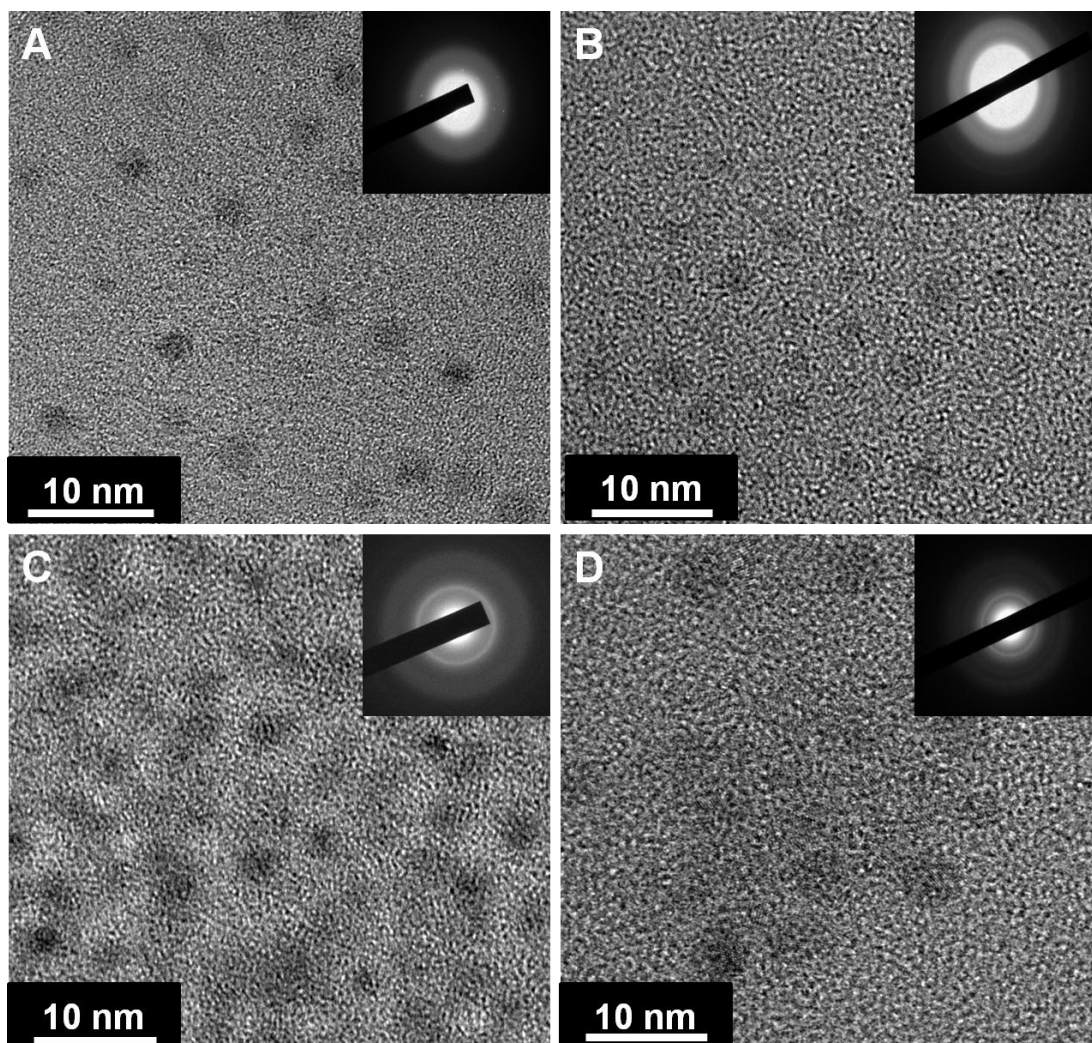


Figure S5. HRTEM images of the four kinds of CDs. The inset is the corresponding SAED pattern.
A) CD_{TMB}; B) CD_{DAB}; C) CD_{PY}; D) CD_{PHA}.

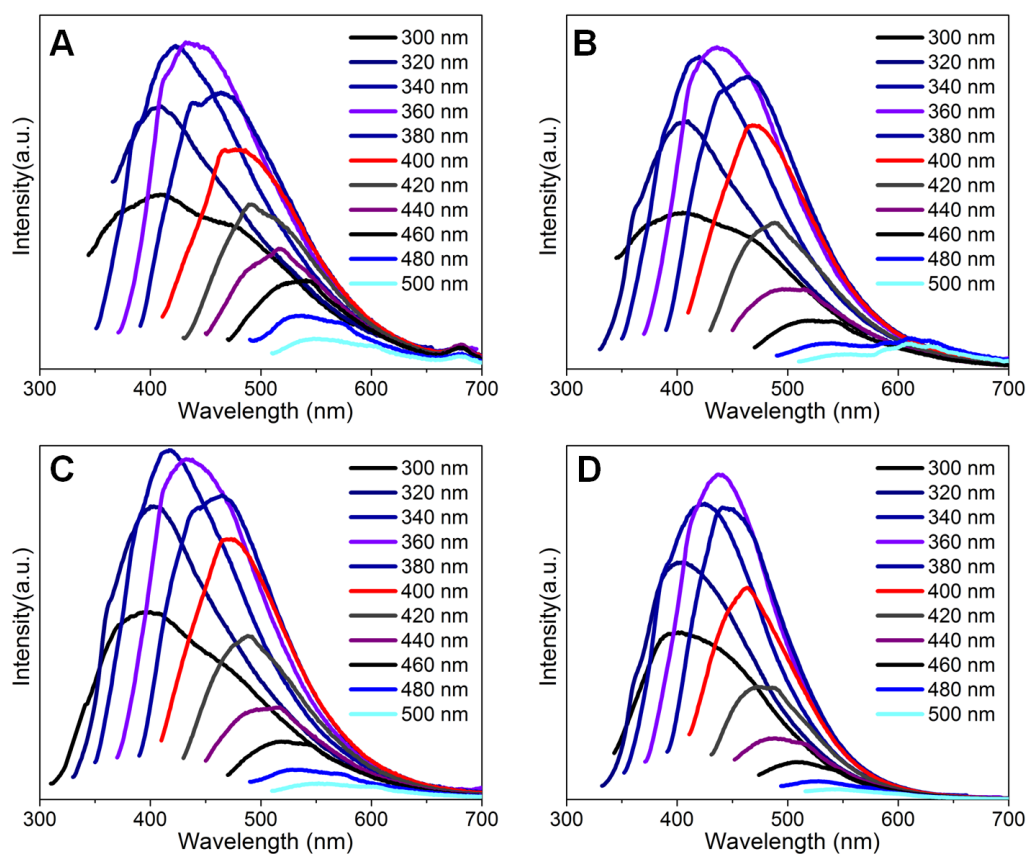


Figure S6. Photoluminescence emission spectra (recorded for progressively longer excitation wavelengths from 300 to 500 nm in 20 nm increments) of carbon dots surface-passivated with PEG_{1500N} in water. A) CD_{TMB}; B) CD_{DAB}; C) CD_{PY}; D) CD_{PHA}.

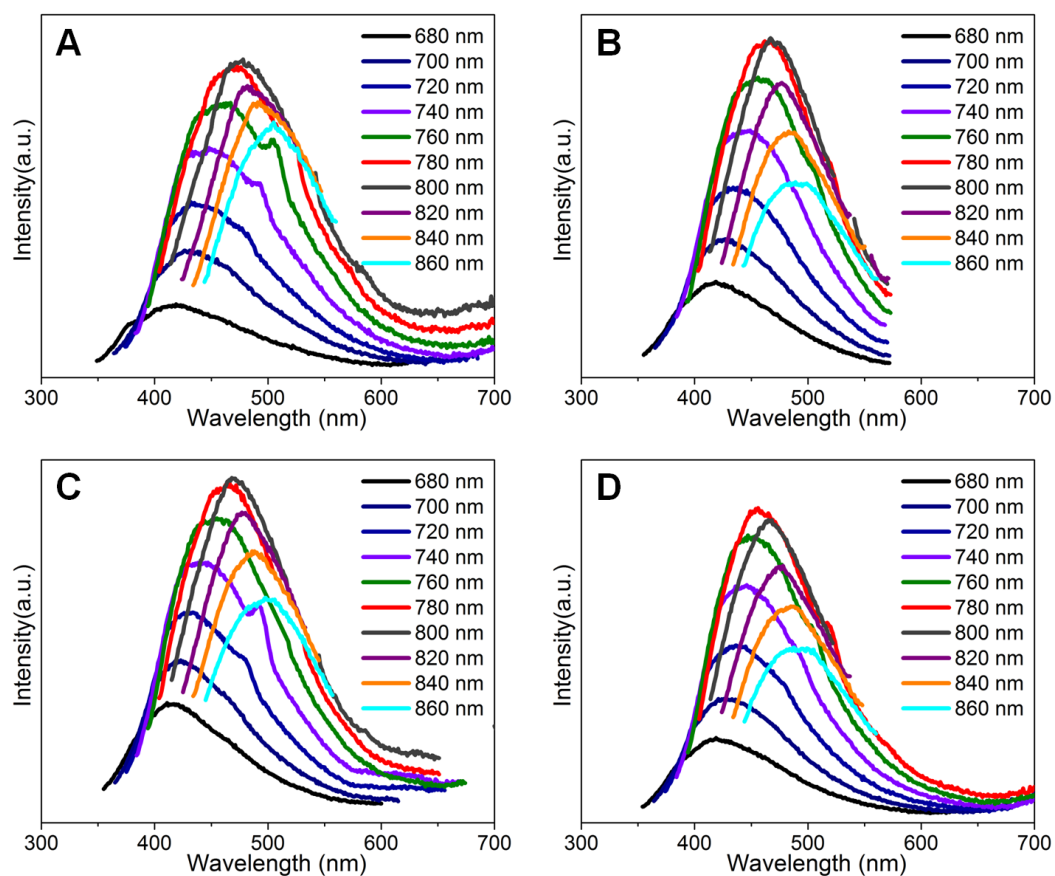


Figure S7. Upconversion photoluminescence emission spectra (recorded for progressively longer excitation wavelengths from 600 to 860 nm in 20 nm increments) of four kinds of CDs surface-passivated with PEG_{1500N} in water. A) CD_{TMB}; B) CD_{DAB}; C) CD_{PY}; D) CD_{PHA}.

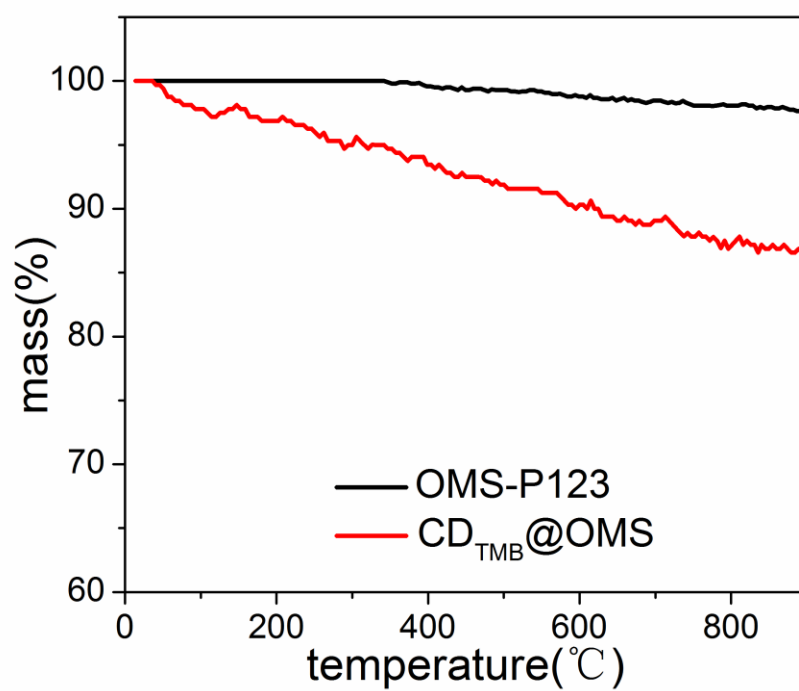


Figure S8. TG analysis spectra of OMS-P123 and CD_{TMB}@OMS (measured in air).