

Supporting Information

Bone-targeting carbon dots : effect of binding affinity by nitrogen-doping

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Table S1 Reaction conditions and optical characterization for carbon dots (CDs).

	Reaction reagents			UV lamp images in DW (at 365 nm)		Excitation (nm)	Emission (nm)	Product
	Alendronate sodium trihydrate	Ethylenediamine (EDA)	DI-water	Vis/UV				
a	1.0014 g	0 μ L	40 mL			330	410	
b	1.0026 g	335 μ L	40 mL			340	405	
c	1.0020 g	500 μ L	40 mL			330	400	
d	1.0031 g	1000 μ L	40 mL			320	400	
e	1.0017 g	2000 μ L	40 mL			295	395	

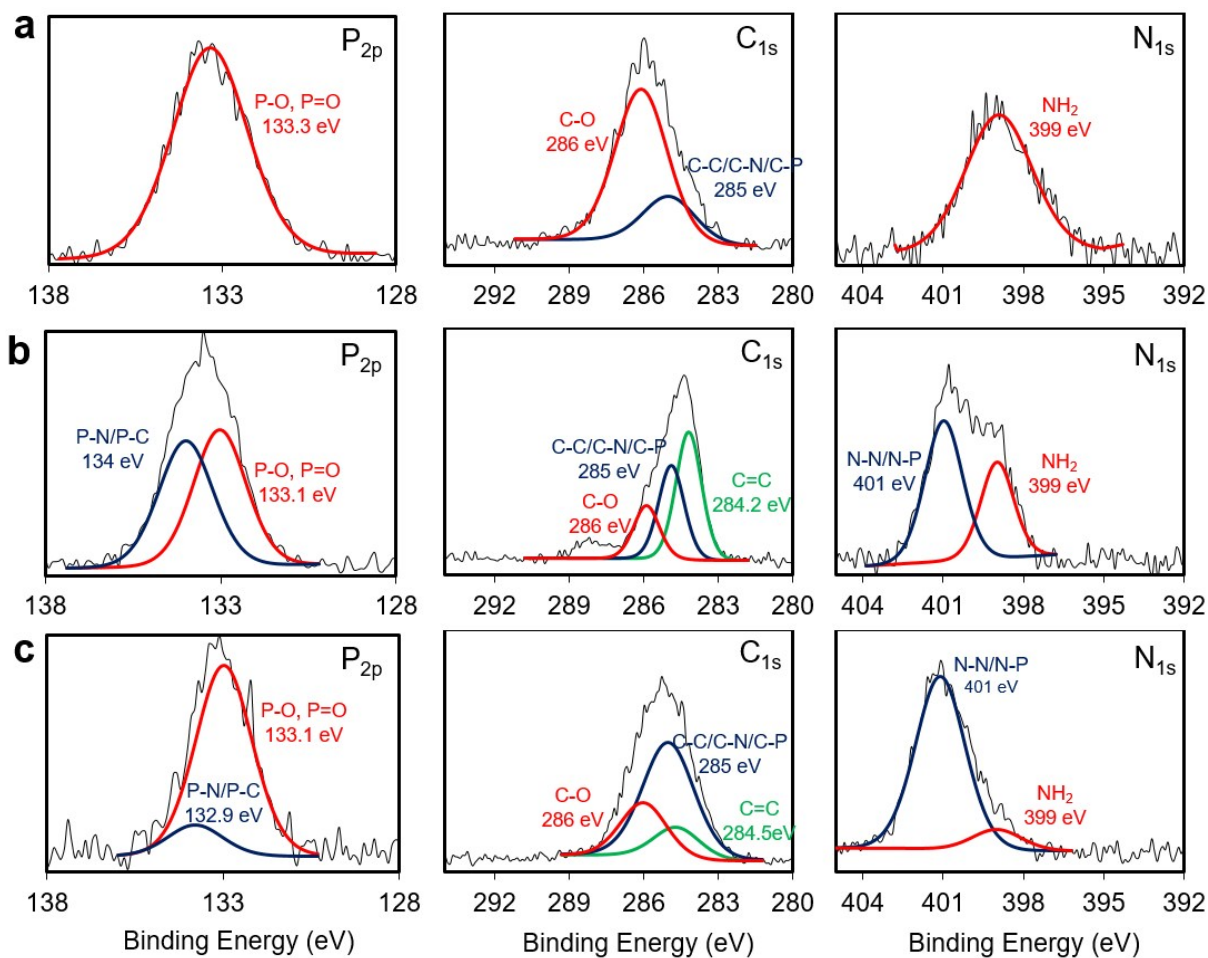


Fig. S1 X-ray photon spectroscopy (XPS) analysis of a) Alendronate, b) Alen-EDA-CDs, and c) Alen-CDs.

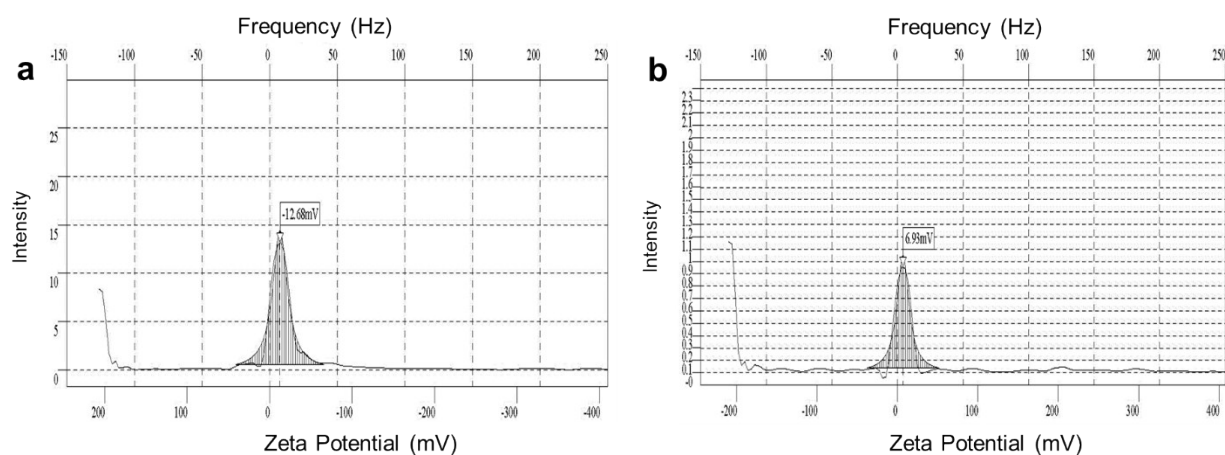


Fig. S2 Distribution of mobility analysis of a) Alen-CDs and b) Alen-EDA-CDs using zeta potential (n=5).

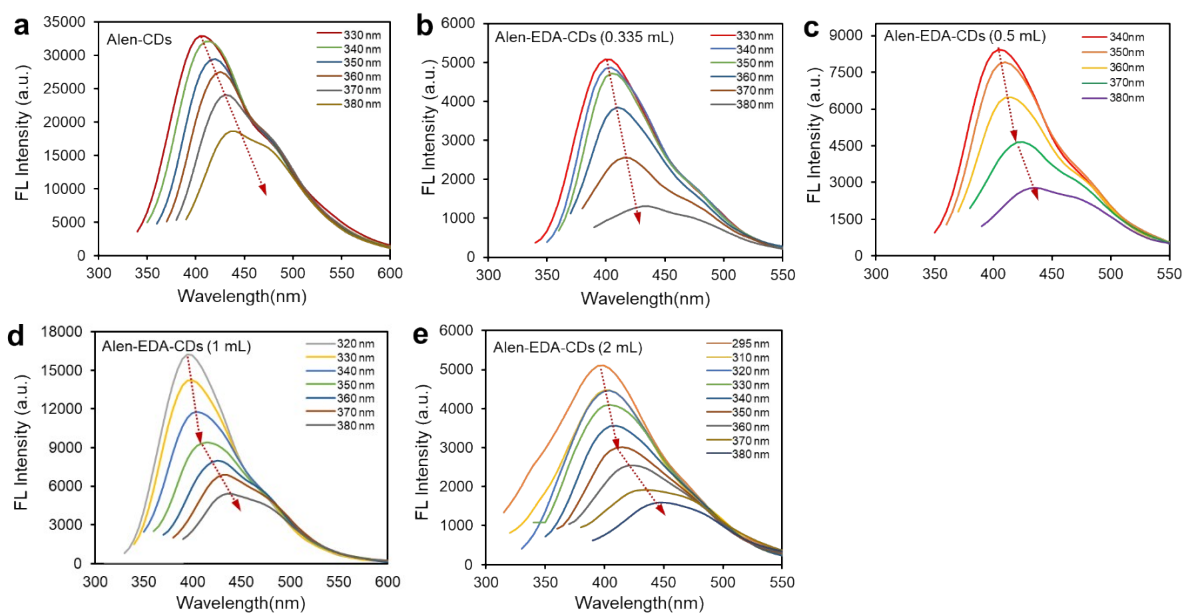


Fig. S3 Excitation dependence of fluorescence spectrum of a) Alen-CDs and Alen-EDA-CDs doped with EDA at b) 0.335 mL, c) 0.5 mL, d) 1 mL and, e) 2 mL.

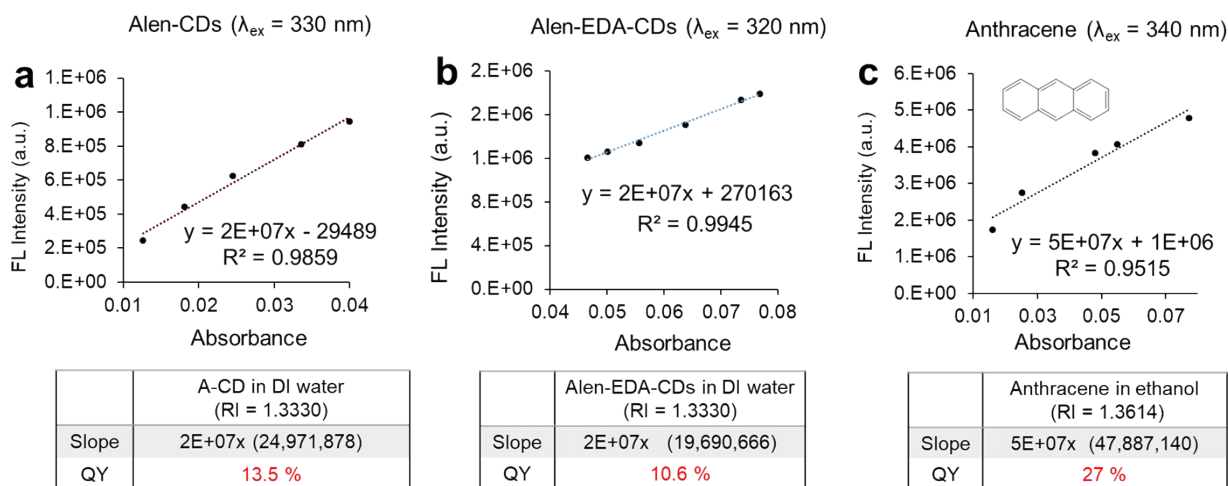


Fig. S4 Quantum yield of a) Alen-CDs, b) Alen-EDA-CDs, and c) anthracene as a relative reference fluorophore.

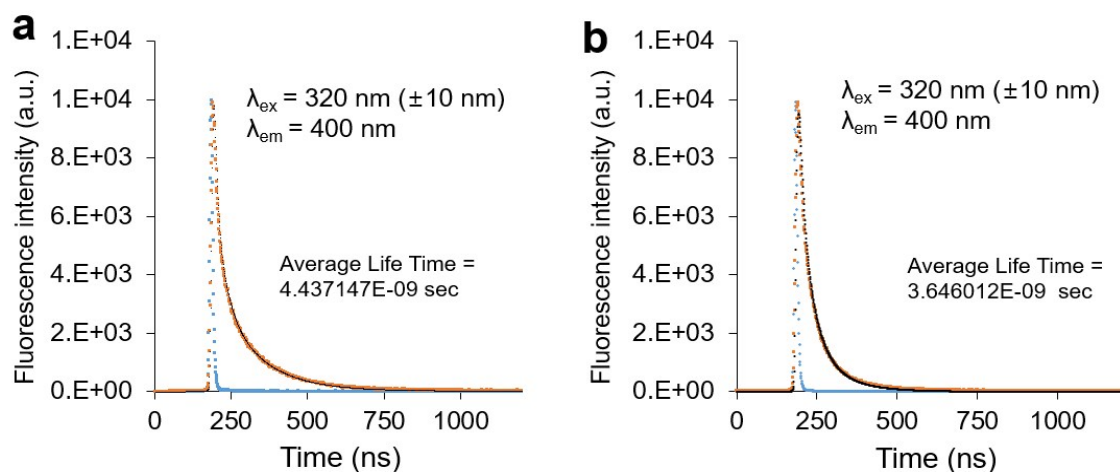


Fig. S5 Fluorescence decay profiles of a) Alen-CDs and b) Alen-EDA-CDs at 320 nm excitation and 400 nm emission.

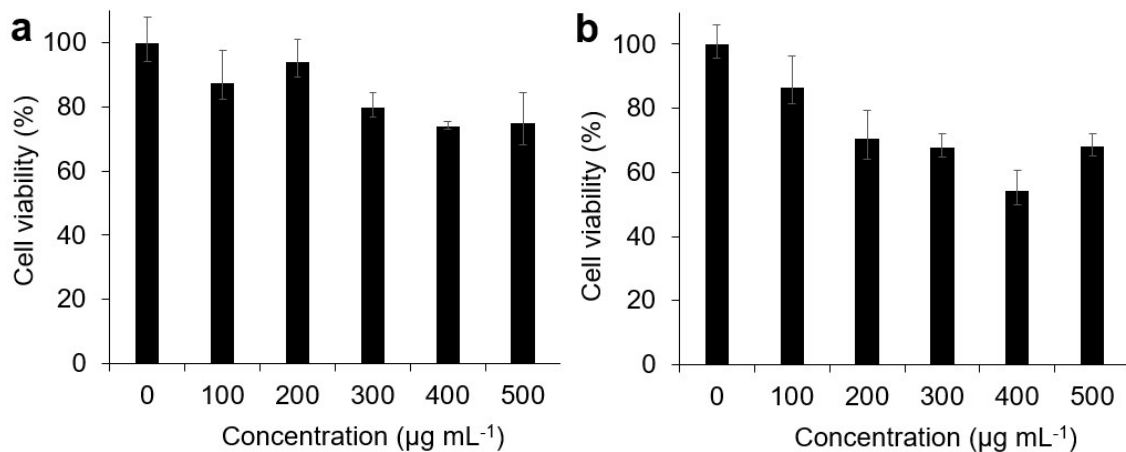


Fig. S6 Cells viability on HeLa cell of a) Alen-CDs and b) Alen-EDA-CDs (n=5).

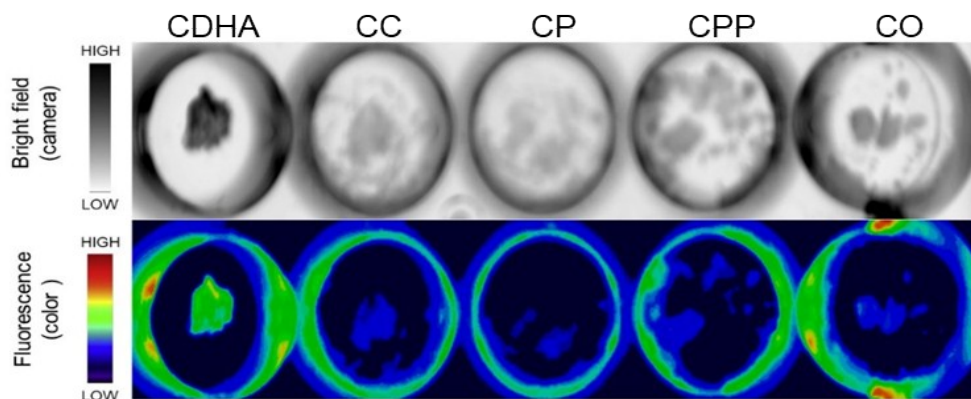


Fig. S7 Specific affinity of Alen-CDs for calcium deficient hydroxyapatite (CDHA), calcium carbonate (CC), calcium phosphate (CP), calcium pyrophosphate (CPP), and calcium oxalate (CO).

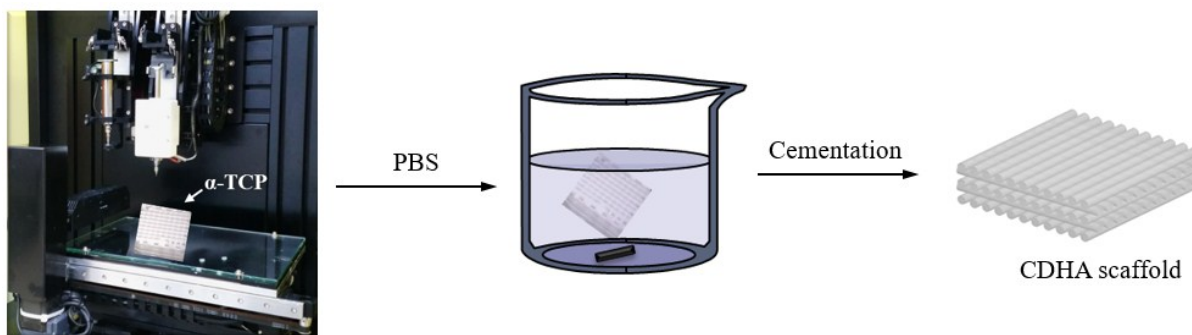


Fig. S8 Schematic diagrams of CDHA scaffold fabrication.

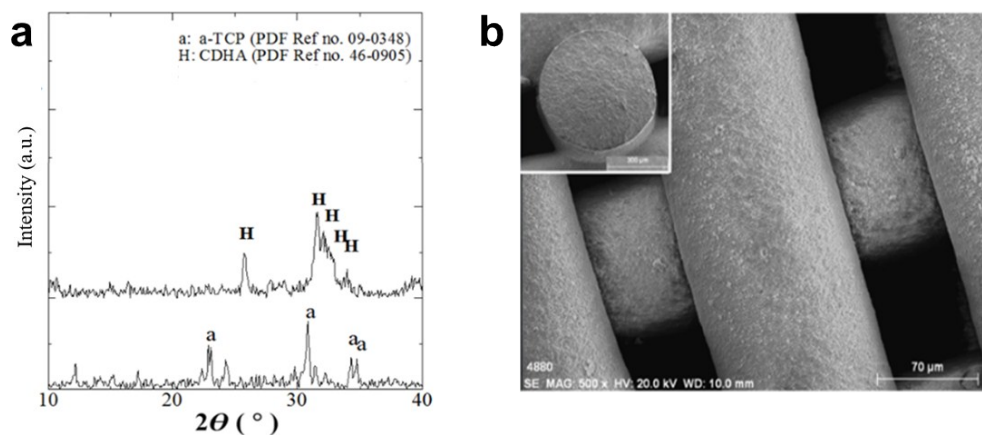


Fig. S9 a) XRD result of α -TCP scaffold (before cementation) and CDHA scaffold (after cementation), and b) SEM image of CDHA scaffold (insert is closed section).

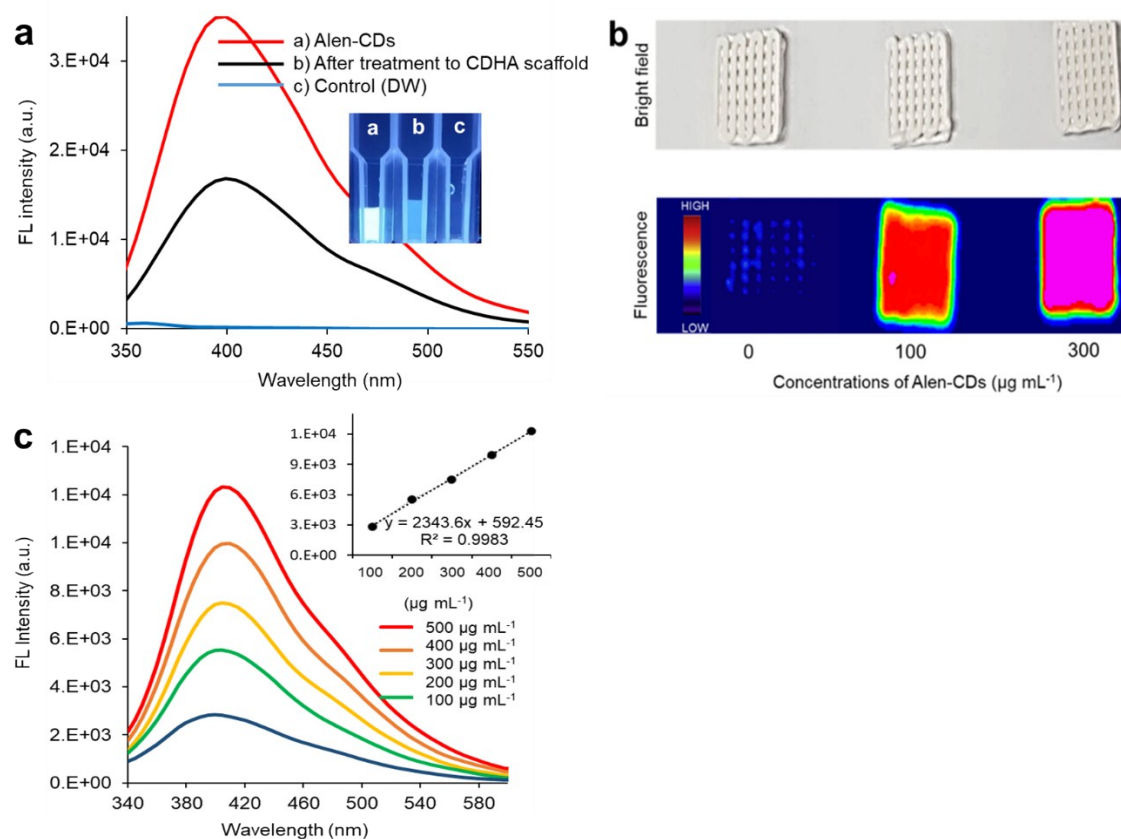


Fig. S10 a) Fluorescence spectrum and images of Alen-CDs solutions (before and after adsorption), b) fluorescence images of Alen-CDs treated scaffolds at different concentrations (0, 100, 300 $\mu\text{g mL}^{-1}$), and c) calibration curve for emission spectrum of Alen-CDs treated scaffolds at different concentrations (100–500 $\mu\text{g mL}^{-1}$).

Table. S2 EDAX analysis of CDHA scaffold a) before and b) after Alen-CDs treatment.

Before Alen-CDs treatment			After Alen-CDs treatment				
a	Element	Weight %	Atomic %	b	Element	Weight %	Atomic %
	O	15.57	29.75		C	11.26	18.50
	P	26.11	25.77		N	2.18	3.07
	Ca	58.31	44.48		O	45.19	55.73
	Totals	100.00			P	16.13	10.27
					Ca	25.25	12.43
			Totals	100.00			