Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

for

Amino acid derived highly luminescent, heteroatom-doped carbon dots for label-free detection of Cd^{2+}/Fe^{3+}, cell imaging and enhanced antibacterial activity

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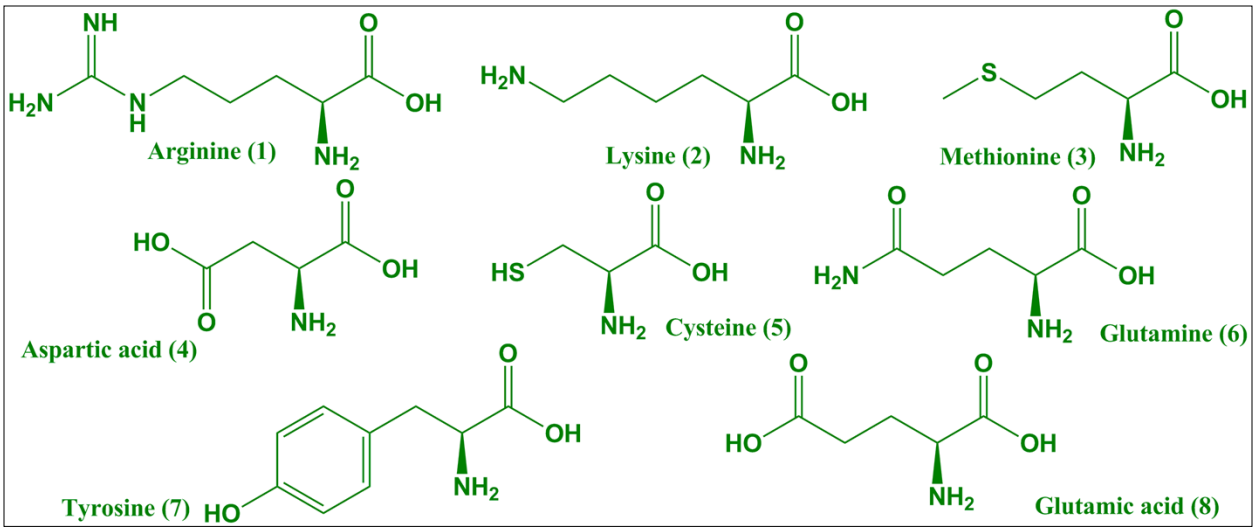

Scheme S1:Chemical formula of all the amino acids used for carbon dots synthesis.

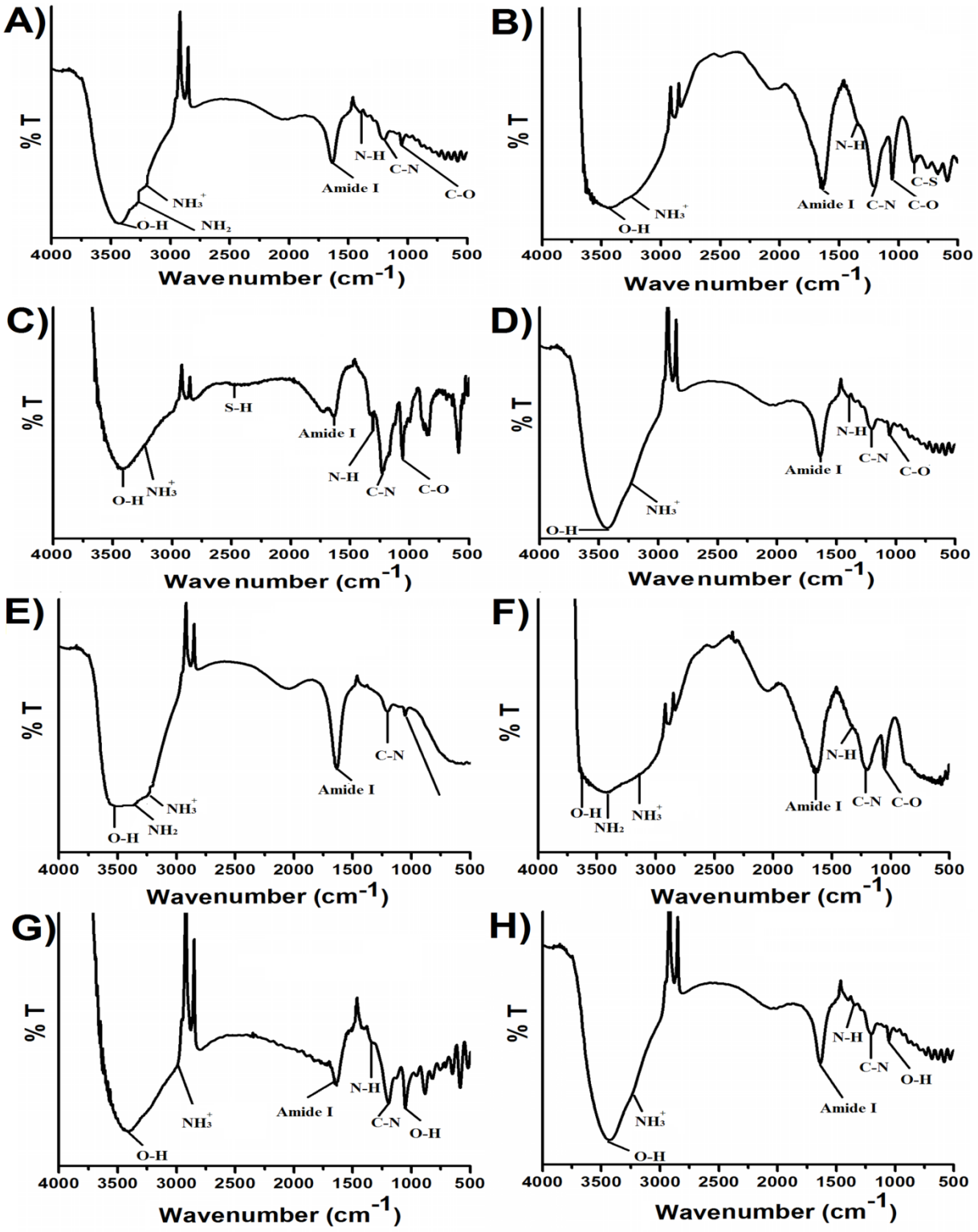

Figure S1: FT-IR spectra of (A) glutamine, (B) methionine, (C) cysteine, (D) aspartic acid, (E) arginine, (F) lysine, (G) tyrosine and (H) glutamic acid-derived carbon dots.

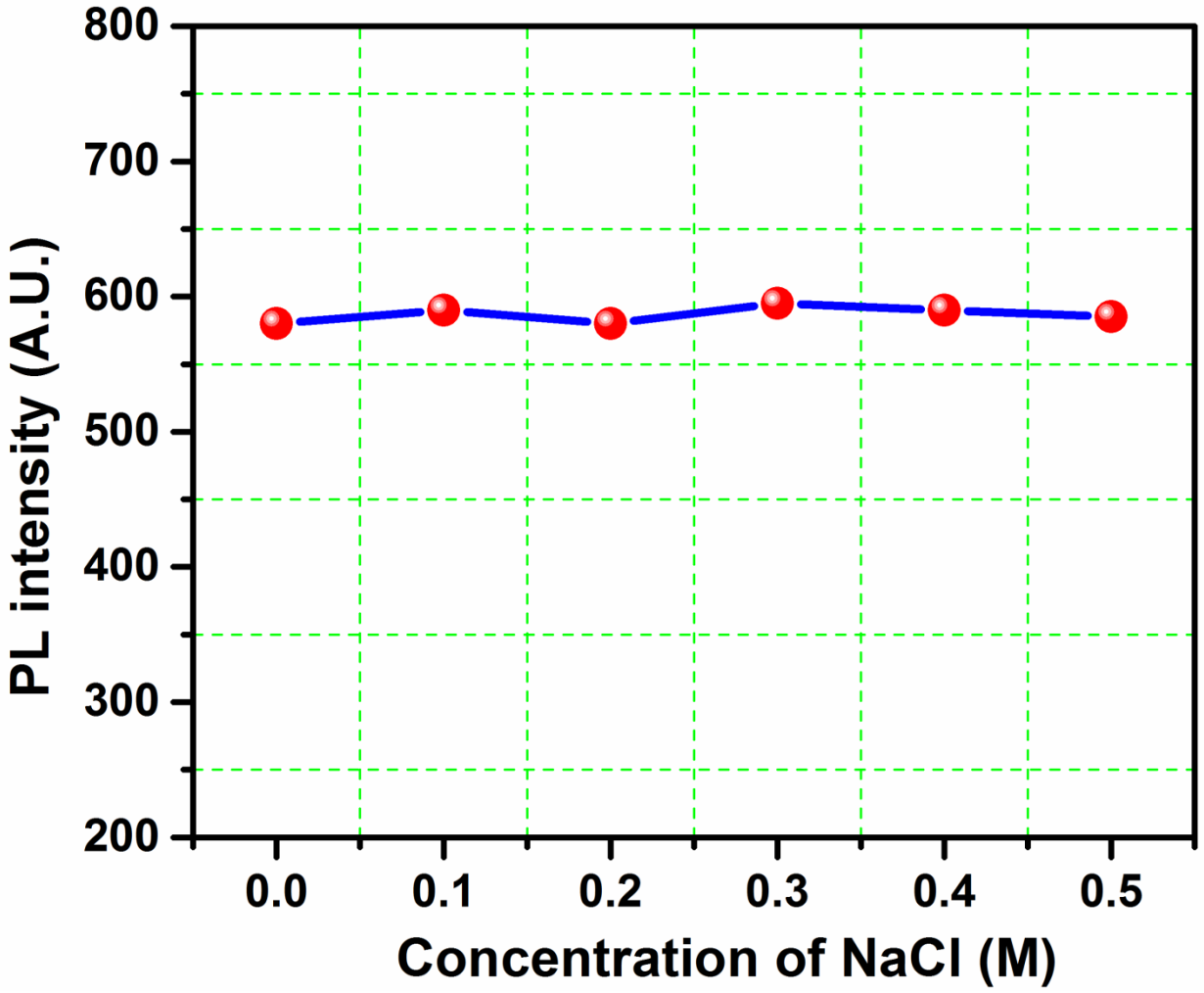

Figure S2: Effect of NaCl concentration as ion effect on the stability of Cys-derived carbon dots.

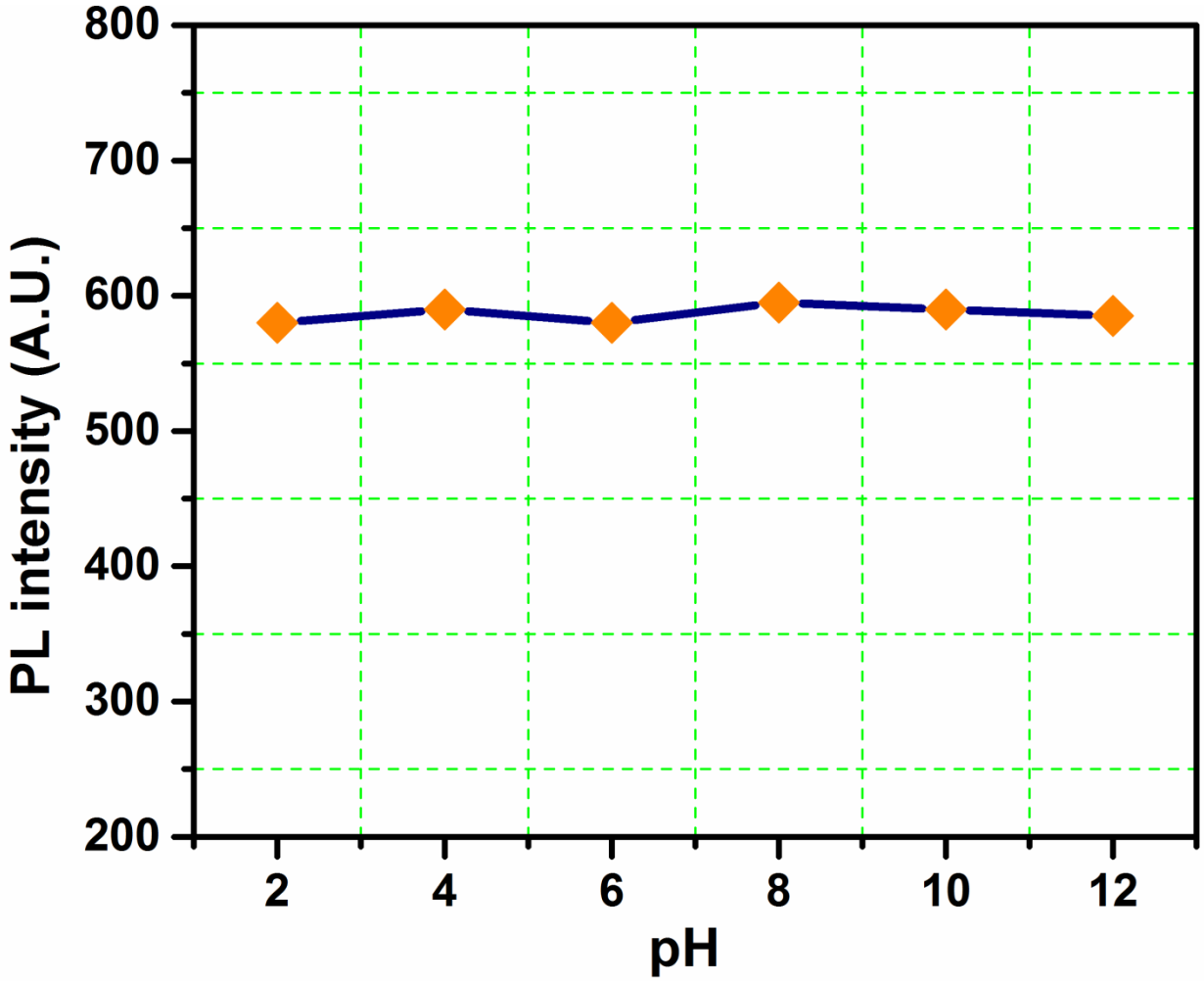

Figure S3: Effect of pH on the stability of Cys-derived carbon dots.

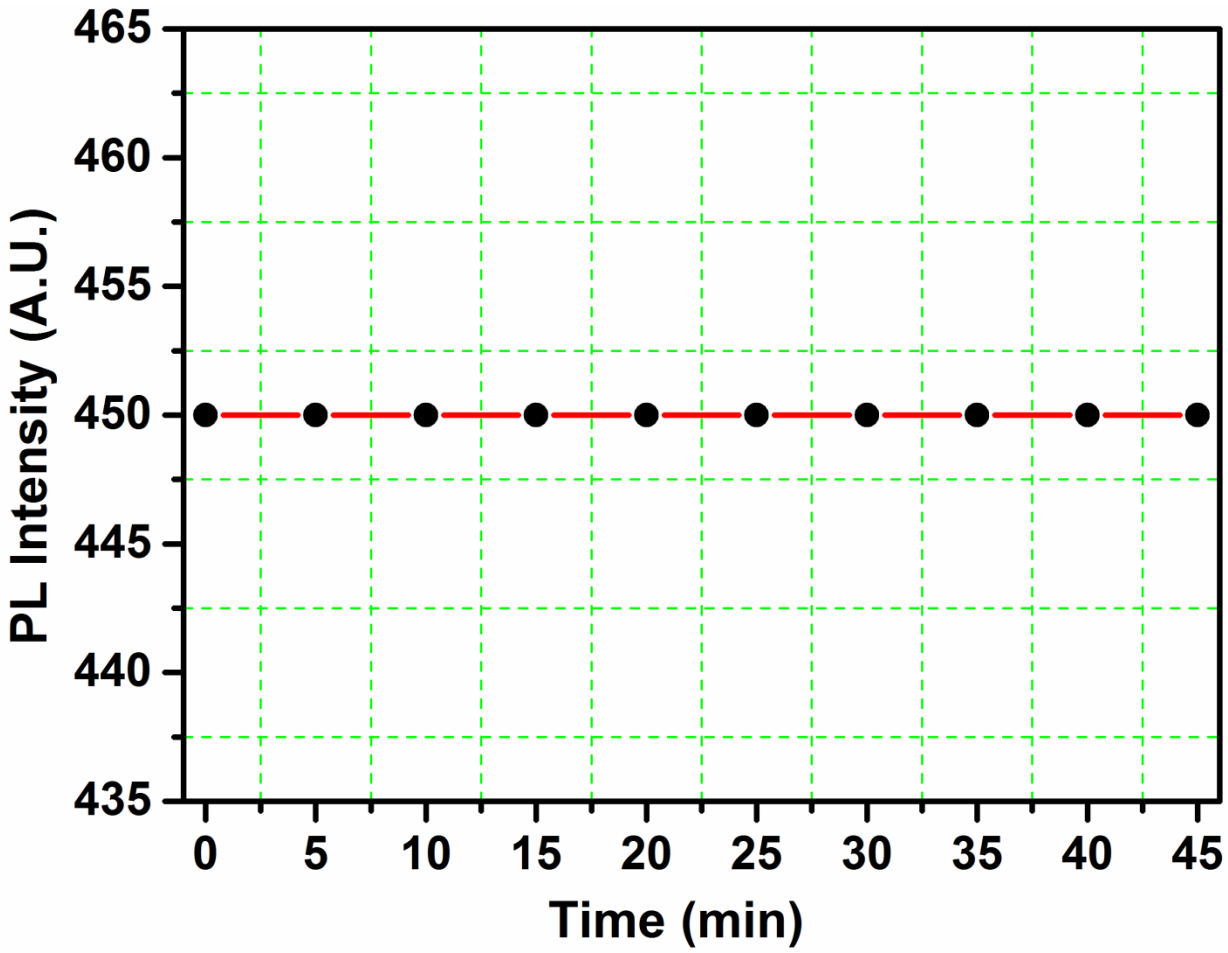

Figure S4: Effect of light irradiation on the stability of Cys-derived carbon dots.

Table S1: Minimum Inhibitory Concentration (MIC) Tests of Au/CDs nanocomposite and $AgNO_3$ for E. Coli.

S.N.	Concentration (ng mL^{-1})	Au/CDs nanocomposite		$AgNO_3$	
		24 h	48 h	24 h	48 h
1.	2000	-	-	-	-
2.	1000	-	-	-	-
3.	500	-	-	-	-
4.	250	-	-	-	-
5.	125	-	-	-	-
6.	75	-	-	-	-
7.	25	-	-	-	+
8.	20	-	+	+	+
9.	15	+	+	+	+

"–" sign indicates no bacterial growth; "+"sign indicates bacterial growth.

Table S2: Minimum Inhibitory Concentration (MIC) values of Cys-CDs against E. coli at different pH values for 24h.

Bacteria	Concentration (ng mL^{-1})			
	pH =5.5	pH =6.5	pH =7.5	pH =8.5
E. coli	19.2	20.0	19.8	19.5

Table S3: Comparative study for detection of metal ions by cysteine derived carbon dots and other reported methods.

S.N.	Source	Metal ion	Range (µg L^{-1})	LOD (µg L^{-1})	Real sample	Reference
1.	Banana peels	Fe^{3+}	112.0–896.0	11.81	-	39
2.	Honey	Fe^{3+}	0.31-5600.0	0.095	Human blood	22
3.	Citric acid	Fe^{3+}	56.0-108920.0	5.04	Real water sample	40
4.	Citric acid	Fe^{3+}	0-28000.0	-	-	41
5.	Camphor	Cd^{2+}& Hg^{2+}	28.0-336.0	-	-	42
6.	Cysteine	Fe^{3+}	6.0-250.0	3.0	Different water samples	This work
		Cd^{2+}	6.0-268.0	2.0		