Carbon dots derived from kanamycin sulfate with antibacterial activity and selectivity for Cr^{6+} detection

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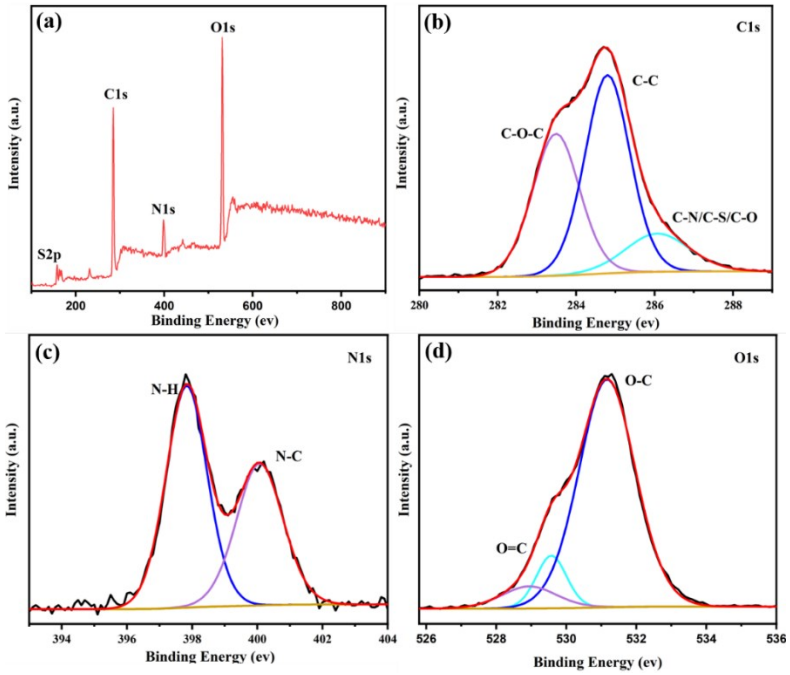

Fig. S1 (a) XPS full scan spectrum. High-resolution C1s (b), N1s (c), and O1s (d) spectra of the CDs-Kan.

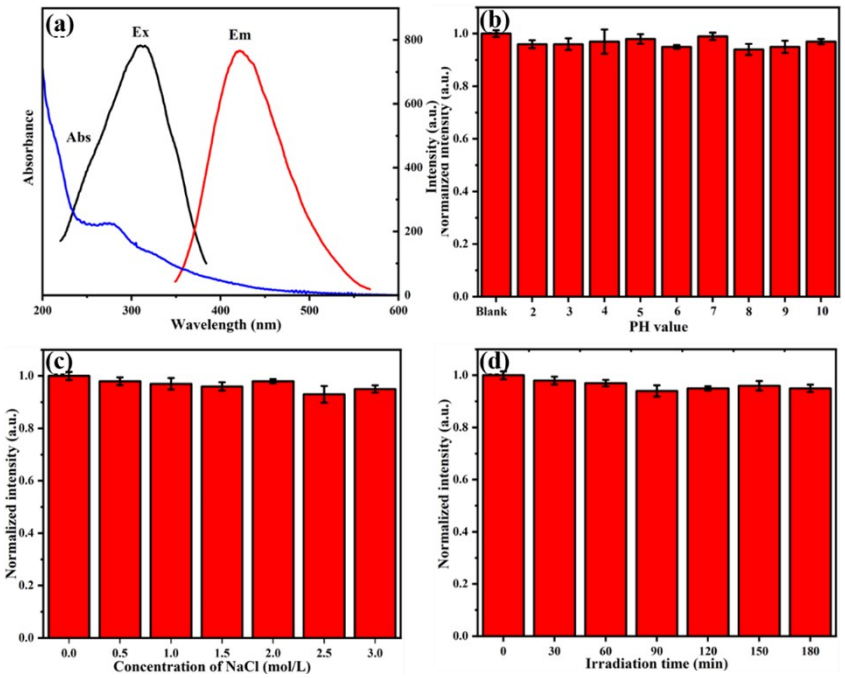

Fig. S2 (a) UV-vis, excitation and emission spectra of CDs-Kan. (b)The fluorescence intensity of CDs-Kan with the sample pH value from 2 to 10. (c) Normalized fluorescence intensity of CDs-Kan in different NaCl concentrations ranging from 0 to 2 M. (d) Normalized fluorescence intensity of CDs-Kan under UV (365 nm) irradiation for 3 h.

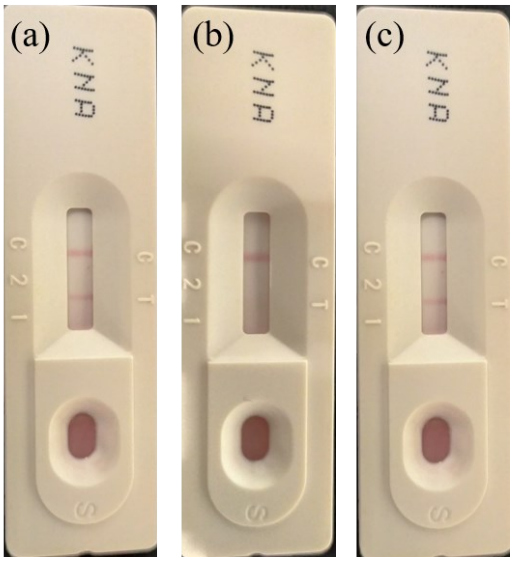

Fig. S3 Kan colloidal gold test card (a) Purified water without Kan (negative control) (b) CDs-Kan before dialysis (positive, Kan residue) (c) CDs-Kan after dialysis (negative, no Kan residue).

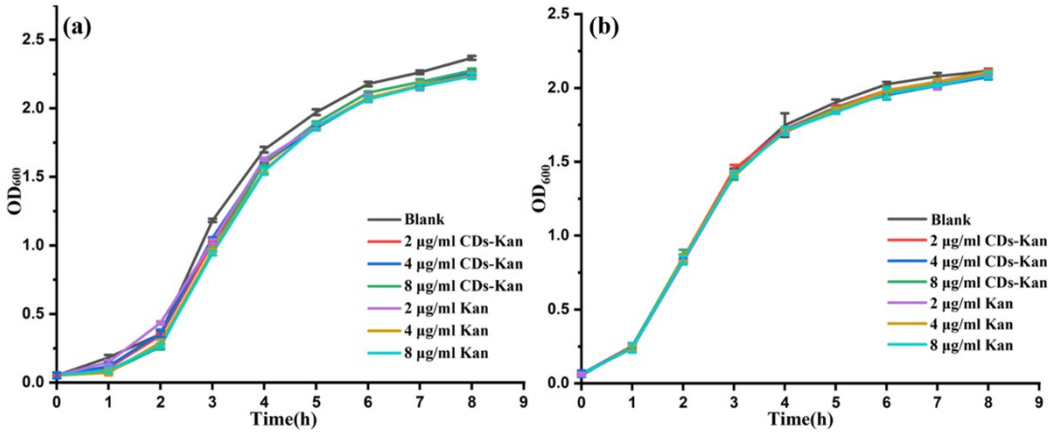

Fig. S4 (a) Growth curves of P. aeruginosa treated with CDs-Kan and Kan of different concentrations (0-8 h). (b) Growth curves of E. coli(ΔsidA) treated with CDs-Kan and Kan of different concentrations (0-8 h).

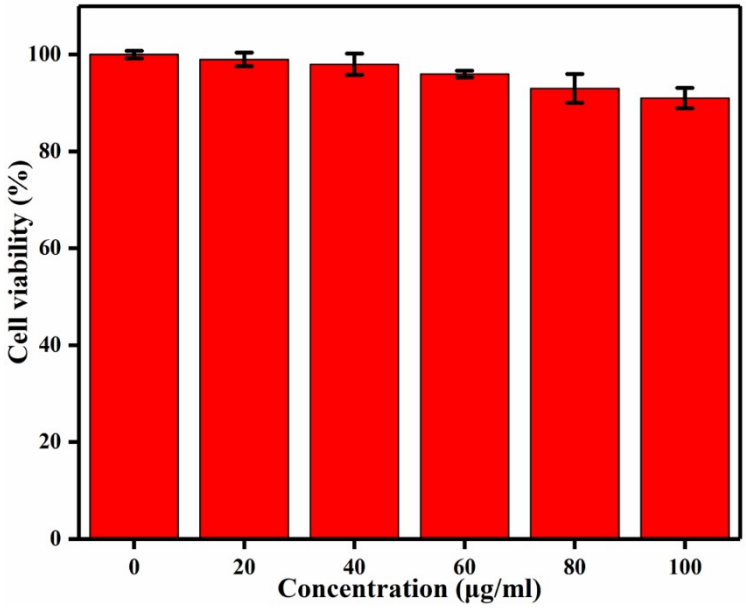

Fig. S5 Hela cell viability from MTT assays with different CDs-Kan concentration after 24 h incubation

Table S1 Comparison of synthetic CDs of different precursors

Precursor	Synthetic methods	Size (nm)	QY (%)	Ex (nm)	Em (nm)	Bacteriostatic mechanisms	Ref.
Kanamycin sulfate	hydrothermal	3.87	5.26	315	415	preservation Precursor property.	This work
Tinidazole and metronidazole	hydrothermal	16.5 ,15.1		400, 400	492, 463	preservation Precursor property.	1
ampicillin	hydrothermal	5.5	23	345	438	photoinduced bactericidal.	2
Gentamicin sulfate	hydrothermal	2-8	8.9	340	400	Preservation Precursor property and production of reactive oxygen species (ROS).	3
chlorhexidine gluconate	hydrothermal	1-10	2.6	485	528	leakage of cellular components by destroying the permeation barrier on the bacterial cytoplasmic membrane.	4
Metronidazole	hydrothermal	2.86	28.1	380	443	preservation Precursor property.	5

Table S2 Comparison of LOD with the reported methods of Cr^{6+} determination

Precursor	Linear range (μM)	LOD (nM)	Ref.
CDs-KS	0–60	0.36	This work
N-CDs	0.01-250	5	6
CDs	1.6–50	1.6	7
P-doped CDs	1.5–30	0.023	8
N, S-doped CDs	1–80	0.86	9
N-CDs	0.25-175	0.08	10
N-doped CDs	0–4	2.598	11

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