Supporting Information

Fluorescent N doped carbon dots-hydrogel composite for concurrent selective detection and local hot spot promoted adsorption of uranium (VI)

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Experimental Section:

1. **Luminescent Sensing of U(VI)**: Table S1 was listed to compare with the previous reported detection limitation [1-15].

2. **Selection of the precursors of the NCDs**: Fluorescence CDs containing graphene core and organic shell have excellent water solubility and various groups on the surface which play a crucial role in donating the reactive sites for UO_2^{2+} ions. Literature using levofloxacin, a kind of fluorinated quinolone derivatives, as a precursor of synthetic carbon dots had been reported [16]. On the one hand, Levofloxacin has a similar structure compared to norfloxacin compound which has nitrogen heterocyclic structure and various phosphorescent characteristics. On the other hand, uranyl ion had assessment based on the fluorescence quenching of Norfoxacin [17]. Norfloxacin is one kind of polluted compound in water which is excepted to removed or converted to environmental friendly CDs [18]. Therefore, we adopted norfloxacin with unique nitrogen heterocyclic structure as a precursor of synthetic NCDs for detection and adsorption of UO_2^{2+}.

Table S1. The detection limits comparison of the reported materials for UO_2^{2+}.

Materials	Detection limit	Ref.
CQDs	28 nM, 6.53 ppb	[1]
HNU-50	12 nM, 2.77 ppb	[2]
CMPAO	0.40 ppb	[3]
YTU-100	1.07 ppb	[4]
Tb-MOF/Tb-AG	0.0012 ppb	[5]
CDs	4.7 ppb	[6]
FPD	2100 ppb	[7]
QDCOF	28.6 ppb	[8]
CDs	710 ppb	[9]
Titanium electrode	24.5 ppb	[10]
Dual-color CDs	1899 ppb	[11]
Tb-FAP/agar	7.95 nM, 1.85 ppb	[12]
COF	6.7 nM, 1.56 ppb	[13]
small-molecule-based fluorescent probes	10 nM–1 μM, 2.33 ppb–233 ppb	[14]
TAPM-DHBD	4.08 nM, 0.96 ppb	[15]
NCDs-CMH	8.4 nM, 1.94 ppb	This work

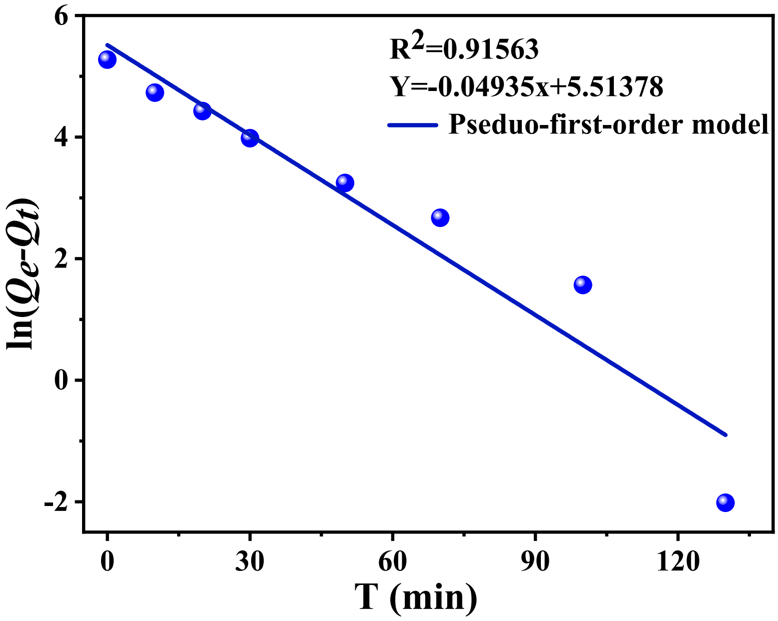

Fig.S1 the pseudo first order kinetic constant. q_e, k_1 can be calculated from the slope and intercept of the plot of log (q_e-q_t) versus *t*.

Table.S2 The linear fitting results and kinetic parameters

Parameter	Pseudo-first-order model		Pseudo-second-order model	
C_0 mgL^{-1}	k_1 min^{-1}	R^2	k_2 g(mgmin)$^{-1}$	R^2
100	-0.04935	0.91563	0.00465	0.99872

Table.S3 The estimated thermodynamic parameters are summarized.

T (K)	K_d (mL/g)	$\triangle H^\theta$ (kJ/moL)	$\triangle S^\theta$ (J/moL)	$\triangle G$ (kJ/moL)
295	$1.90*10^5$			-25.68
315	$1.939*10^5$	28.35074	183.15742	-29.34
335	$1.974*10^5$			-33.01

Table.S4 The comparison of adsorption capacity with previously reported work.

Absorption material	C_0 (mg/L)	Q_e	Ref.
PAA/CS hydrogel	500	290 mg/g	19
P(AAm/MA) hydrogels	1500	156 mg/g	20
Graphene (rGO) hydrogel	100	134 mg/g	21
Metal–phenolic network membranes	238	140mg/L	22
CS–Fe membranes	30	170 mg/g	23
CMH-NCDs	100	194 mg/g	**Our work**

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