

## Electronic Supplementary Information

*Article*

# A fluorescent nanosensor for silver ( $\text{Ag}^+$ ) and mercury ( $\text{Hg}^{2+}$ ) ions using Eu(III) doped carbon dots

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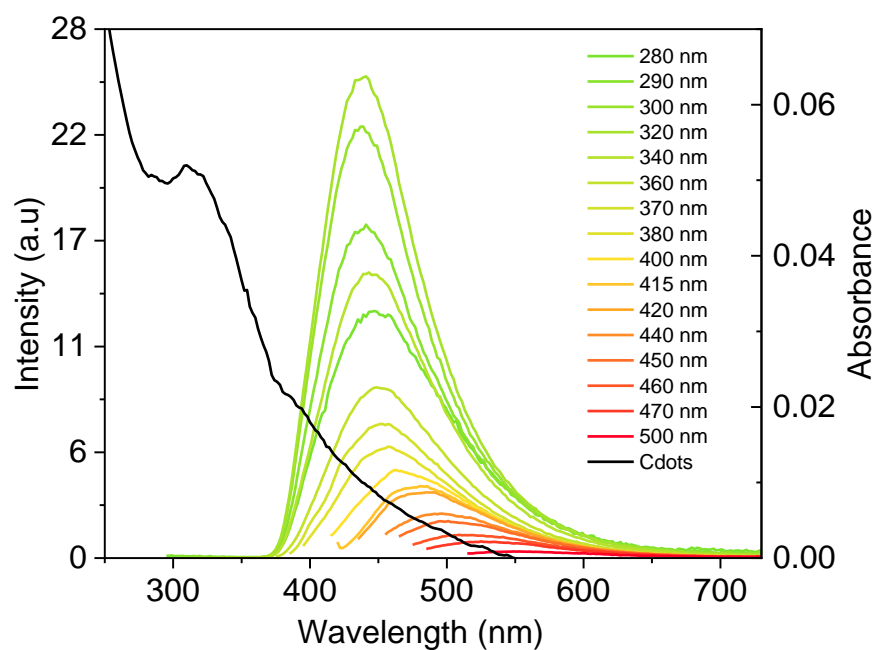
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**Table S1.** High resolution XPS spectra of the C1s and O1s peaks of the Cdots and Eu-Cdots with the attribution to functional groups and the corresponding atomic percentages.

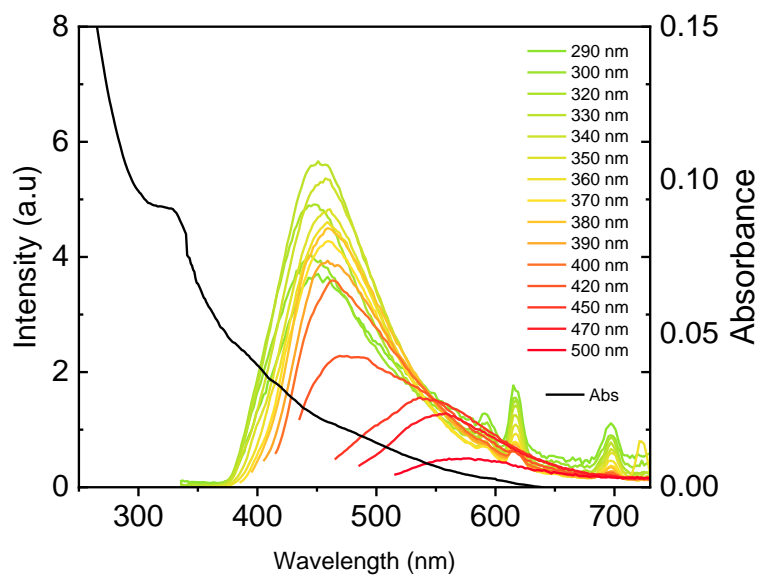
	BE (eV) Cdots (Eu-Cdots)	assignment	Cdots (%)	Eu-Cdots (%)
C1s,	285.0 (285.0)	C=C/C-C	53.8	42.4
	286.8 (286.6)	C-OH/C=O COH/COC	17.8	16.5
	288.5 (288.6)	O-C=O/N-C=O COO <sup>-</sup> ...Eu <sup>3+</sup>	27.7	29.5
	290.2 (289.7)	O-COO <sup>-</sup> O-COO <sup>-</sup> ....Eu <sup>3+</sup>	0.7	11.6
O1s	531.5 (531.6)	C=O COO <sup>-</sup> ...Eu <sup>3+</sup> / O-COO <sup>-</sup> ...Eu <sup>3+</sup>	58.5	81.5
	532.6 (532.8)	COH O-COO <sup>-</sup> ....Eu <sup>3+</sup>	32.8	14.7
	533.5 (534.0)	H <sub>2</sub> O	8.7	3.8
N1s	398.4 (398.7)	sp <sup>2</sup> C-N=C	10.1	6.5
	399.9 (400.2)	sp <sup>3</sup> >N-C=O	87.5	67.5
	401.4 (402.0)	>N <sup>+</sup> =C, -NH <sup>+</sup> <sub>3</sub>	2.4	26.0

**Table S2.** Decay parameters of the C-dots and Eu-cdots emission in the absence and presence of 100  $\mu$ M of Ag<sup>+</sup> and Hg<sup>2+</sup>

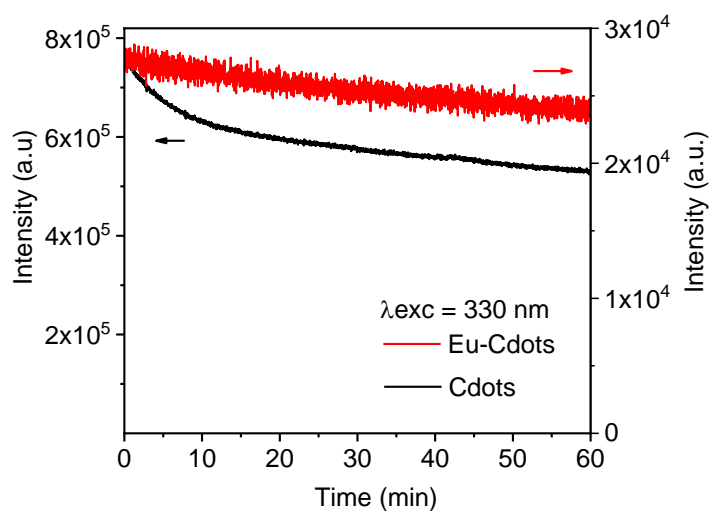
Decay parameters	Cdots	Eu-Cdots	Eu-Cdots + Ag <sup>+</sup> (100 $\mu$ M)	Eu-Cdots + Hg <sup>2+</sup> (100 $\mu$ M)
$\tau_1$ /ns (a <sub>1</sub> )	3.11 (0.40)	3.00 (0.26)	2.19 (0.34)	4.78 (0.21)
$\tau_2$ /ns (a <sub>2</sub> )	8.60 (0.20)	7.90 (0.23)	8.50 (0.14)	12.27 (0.53)
$\tau_3$ /ns (a <sub>3</sub> )	0.67 (0.40)	0.67 (0.52)	0.50 (0.52)	1.00 (0.26)
$\tau_{av}$ /ns	3.23	2.95	2.19	7.77
$\chi^2$	1.0	1.0	1.1	1.1



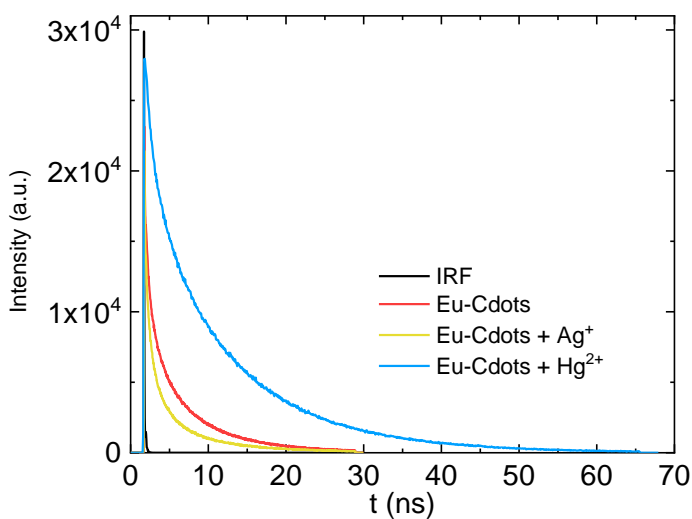
**Figure S1.** Absorption spectrum (black) and luminescence spectra (green to red) of undoped Cdots. Excitation at several wavelengths is shown.



**Figure S2.** Absorption spectrum (black) and luminescence spectra of the Eu-Cdots upon excitation at several wavelengths (green to red).



**Figure S3.** Photostability of Cdots and Eu-Cdots. Emission intensity of Cdots (black) and Eu-Cdots (red) under irradiation at 330 nm.



**Figure S4.** Emission decay curves for Eu-Cdots (red), and Eu-Cdots in the presence of 100 mM of  $\text{Ag}^+$  (yellow) and  $\text{Hg}^{2+}$  (blue). The Instrumental response function (IRF) is shown in black.