

High Quantum Yield Boron-doped Carbon Dots: Ratiometric Fluorescent Probe for Highly Selective and Sensitive Detection of Mg²⁺ ions

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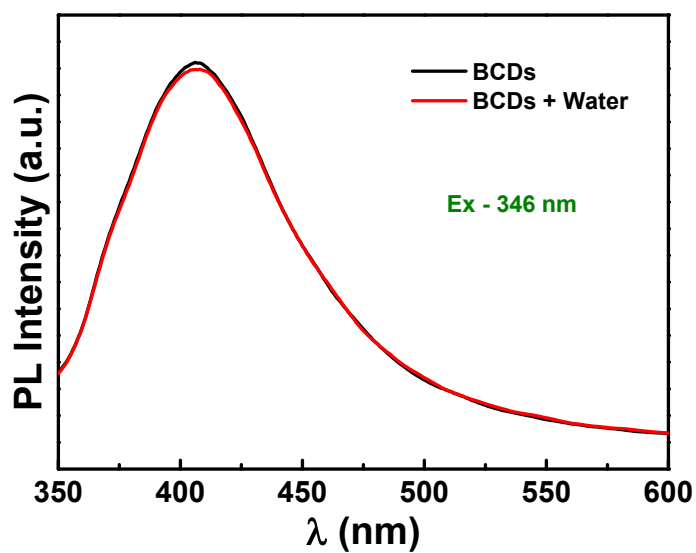


Figure S1. Fluorescence spectra of BCDs solution without and with 200 μ l of water content.

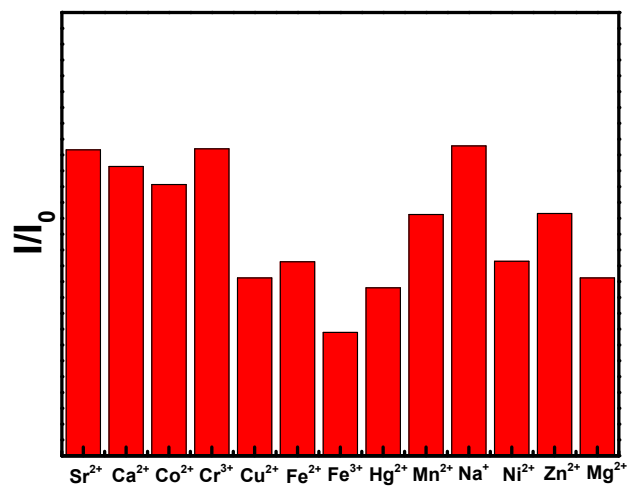


Figure S2. Selectivity of BCDs sensor towards different metal ions based on PL quenching at .

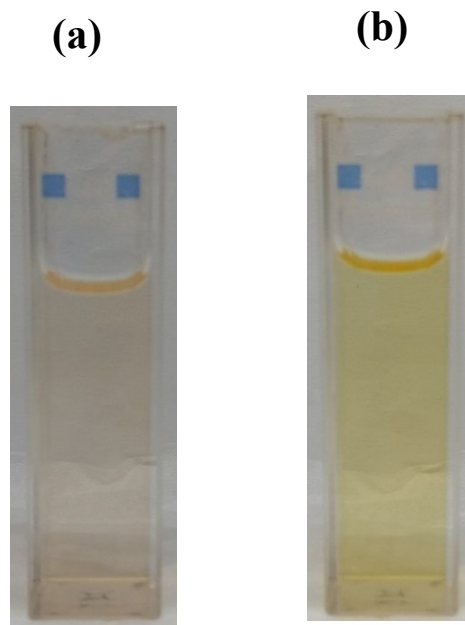


Figure S3. (a and b) Optical images of BCDs without and with Mg^{2+} ion.

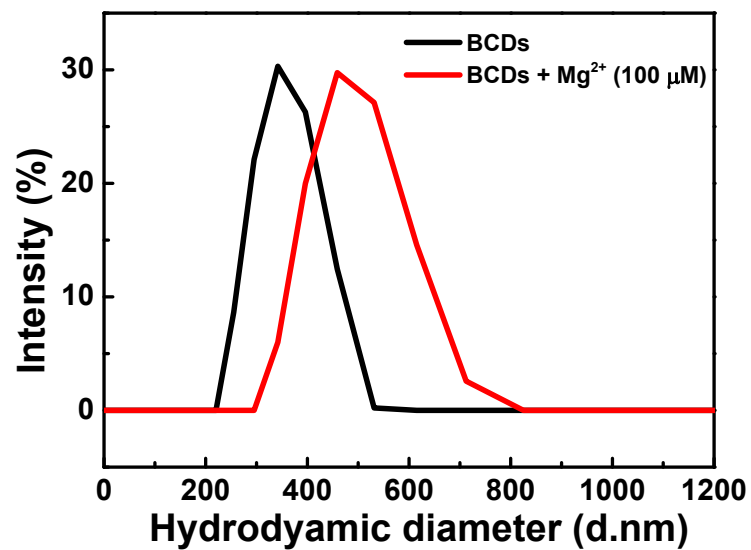


Figure S4. DLS spectra of BCDs without and with Mg^{2+} ion.

Table S1. Comparison of Mg²⁺ ion sensing with different fluorescent probes

Sensing probes	Fluorescence switch	Detection limit	Reference
calix[4]arene diamide	Turn-on	0.138 μM	(1)
DCHQ5	Turn-on	0.2 μM	(2)
PEBBLE Nanosensor	Ratiometric emission	340 μM	(3)
o - hydroxyl Schiff base	Turn-on	1.47 μM	(4)
Coumarin-bispicolyamine (CBP)	Ratiometric emission	1 μM	(5)
1, 8-naphthalimide derivative	Turn off-Turn on	0.05 μM	(6)
BCDs	Ratiometric emission	39 μM	This work

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Table S2. Comparison of lower detection limits of different methods for Mg²⁺ ion

Method	Lower detection limit	Ref.
Atomic absorption spectroscopy(AAS)	10 mM	1
ICP-MS	0.7 mM	2
³¹ P-NMR	0.66 mM	3
Null-point techniques	0.33 mM	4
Ion selective electrode	0.1 mM	5
Fluorescence spectrofluorometer (This work)	0.075 mM	

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