BPEI based N-doped carbon dots with sensitive and selective Cu^{2+} ion sensing ability

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Table S1. Comparisons of some of the reported studies on the potential sensor applications of CDs for different metal ions.

CDs	Precursors	Synthesis method	Metal ions	LOD	Ref
N-doped	Chebulic myrobalan	Hydrothermal	Fe^{3+}	0.86 μM	[1]
P-doped	Trisodium citrate, Phosphoric acid	Hydrothermal	Fe^{3+}	9.5 nM	[2]
S-doped	Tetra (4-carboxyphenyl) porphyrin, Urea	Hydrothermal	Hg^{2+}	1.73 nM	[3]
S-doped	Succinic acid, sodium thiosulfate	Microwave irradiation	Cr^{3+}	0.17 μM	[4]
N-, and S- co-doped	Chitosan, thiourea, citric acid	Hydrothermal	Hg^{2+}	4 nM	[5]
N-, S-, and P-co-doped	Glutathione, phosphoric acid	Hydrothermal	Al^{3+} Fe^{3+}	10.8 nM 50.7 nM	[6]
N-doped	Polyethyleneimine	Hydrothermal	Cu^{2+}	4.75 μM	[7]
N-doped	Polyethyleneimine, citric acid	Hydrothermal	Cu^{2+}	0.007 μM	[8]
N-doped	Polyethyleneimine, citric acid	Microwave irradiation	Cu^{2+}	10 μM	[9]
N-doped	Polyethyleneimine, 2,4-dihydroxybenzoic acid	Hydrothermal	Cu^{2+}	193 nM	[10]
N-doped	Polyethyleneimine, citric acid	Hydrothermal	Cu^{2+} Co^{2+}	0.39 ppm 0.42 ppm	This study

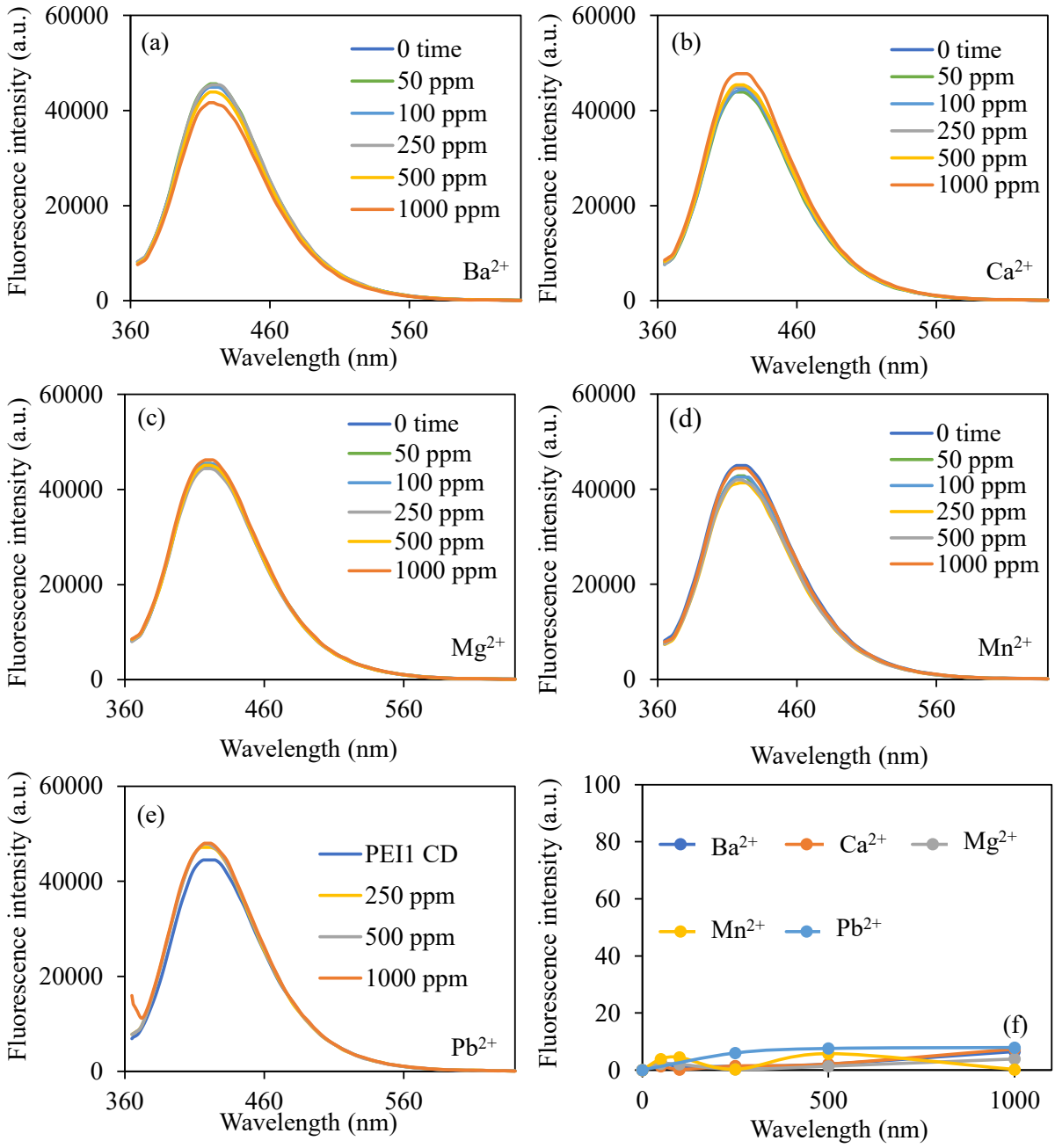


Figure S1. The fluorescence spectra of the B-PEI[1] CDs in the presence of different concentrations of (a) Ba^{2+}, (b) Ca^{2+}, (c) Mg^{2+}, (d) Mn^{2+}, (e) Pb^{2+} ions, and (f) change% in fluorescence intensity of BPEI[1] CDs in the presence of related metal ions. [Excitation wavelength for BPEI CDs: 360 nm; emission wavelengths: 420 nm; the volume of metal ion solutions is 2 mL, and final concentration of BPEI CDs is 0.6 mg/mL.]

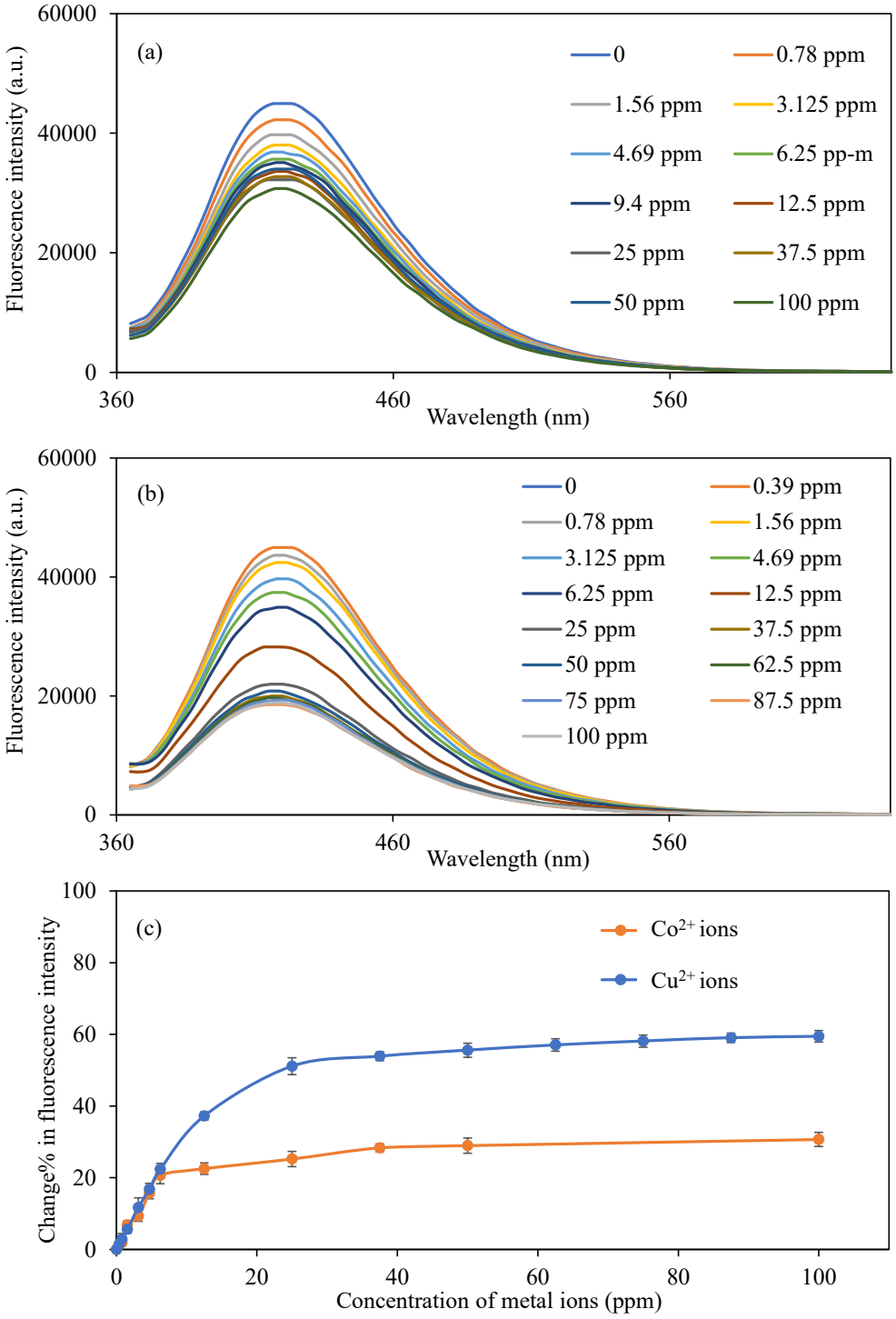


Figure S2. The fluorescence spectra of the B-PEI[1] CDs in the presence of 0-100 concentrations of (a) Co^{2+}, (b) Cu^{2+} ions, and (c) change% in fluorescence intensity of BPEI[1] CDs in the presence of related metal ions. [Excitation wavelength for BPEI CDs: 360 nm; emission wavelengths: 420 nm; the volume of metal ion solutions is 2 mL, and final concentration of BPEI CDs is 0.6 mg/mL.]

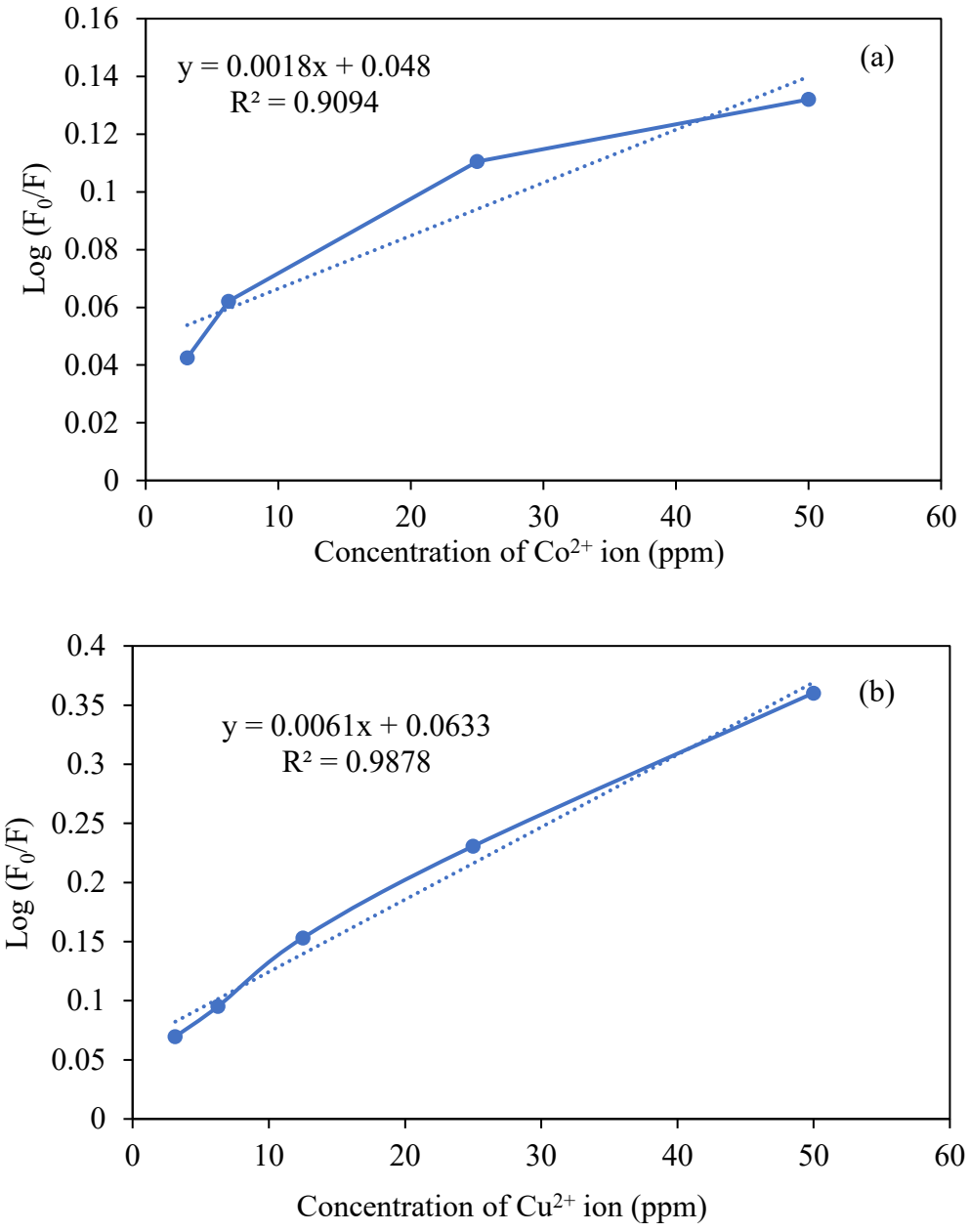


Figure S3. The linear relationship between the log(F_0/F) and the (**a**) Co^{2+}, (**b**) Cu^{2+}concentration, where F and F_0 stand for the concentrations of Cu^{2+} ions in the presence of BPEI[1] CDs.

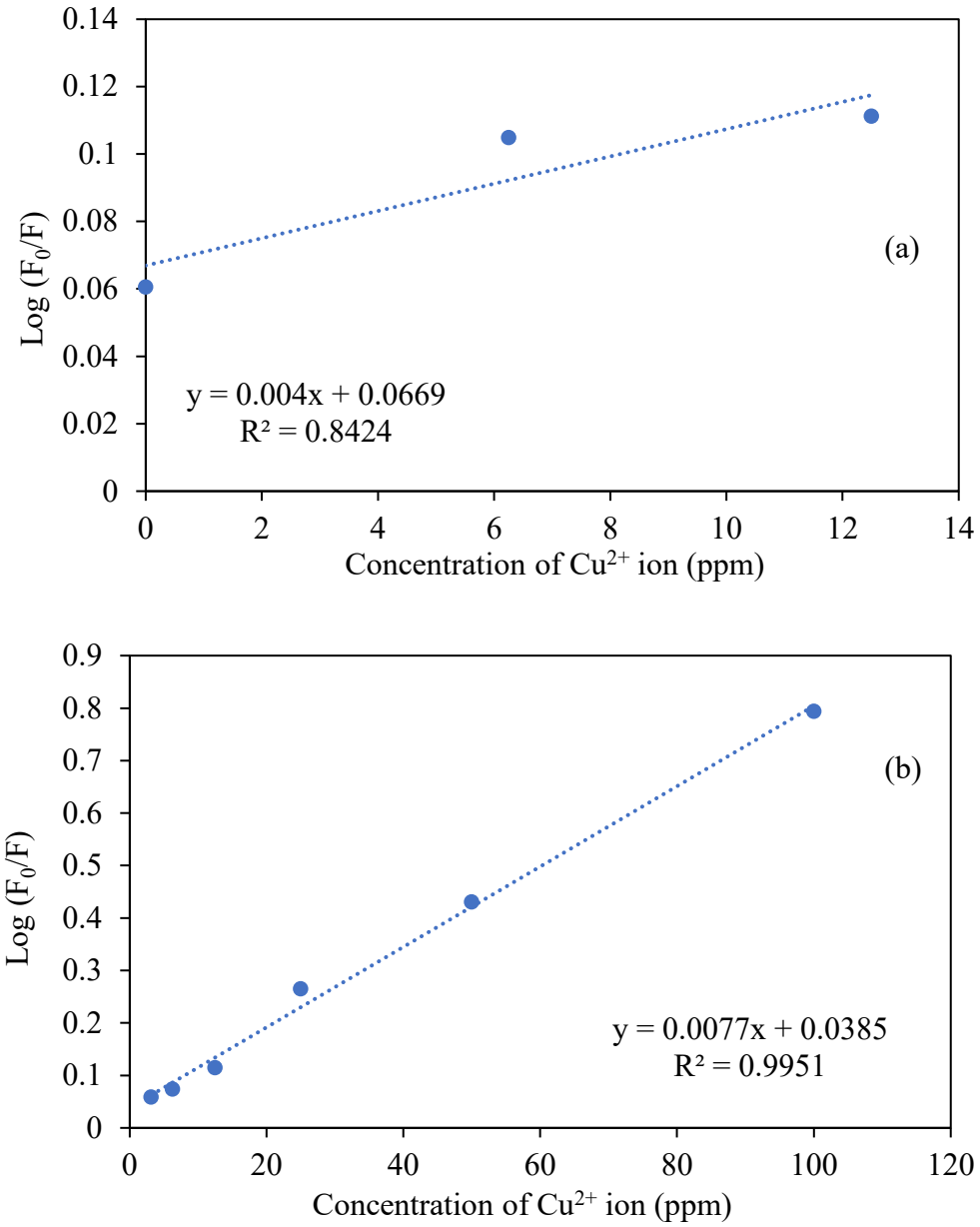


Figure S4. Figure S4: The linear relationship between the log(F_0/F) and the Cu^{2+} concentration, where F and F_0 stand for the concentrations of Cu^{2+} ions in the presence of (**a**) $BPEI^{0.5}$, and (**b**) $BPEI^2$ CDs.

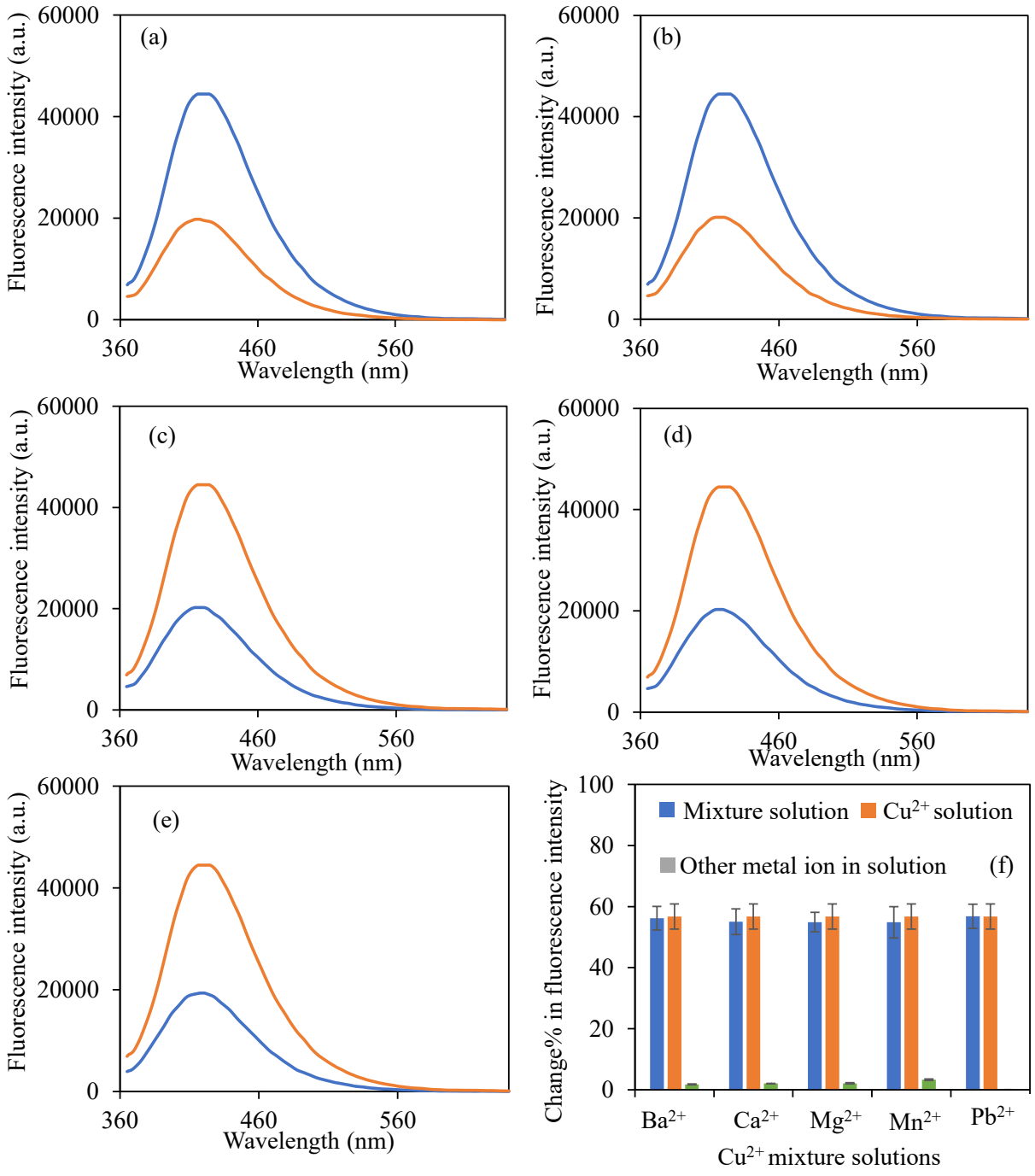


Figure S5. The fluorescence spectra of the B-PEI[1] CDs in the presence of 2 mL 50 ppm concentrations of (**a**) Cu^{2+}-Ba^{2+}, (**b**) Cu^{2+}-Ca^{2+}, (**c**) Cu^{2+}-Mg^{2+}, (**d**) Cu^{2+}-Mn^{2+}, (**e**) Cu^{2+}-Pb^{2+} mixture solution, and (f) change% in fluorescence intensity of BPEI[1] CDs in the presence of 2 mL 50 ppm mixture solutions. [Excitation wavelength for BPEI CDs: 360 nm; emission wavelengths: 420 nm; the volume of metal ion solutions is 2 mL, and the final concentration of BPEI CDs is 0.6

mg/mL. Orange-lined spectrum is bare BPEI[1] CDs in water, blue-lined spectrum is BPEI[1] CDs in mixture solutions.]

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