Electronic Supplementary Information (ESI) for

Encapsulation of Ln^{III} Ions/Ag nanoparticles within Cd(II) Boron Imidazolate Frameworks for Tuning Luminescence Emission

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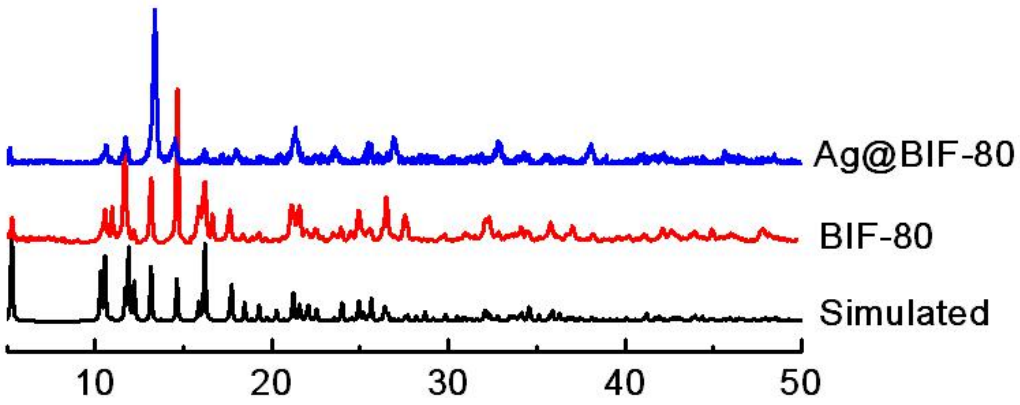

Fig. S1 The PXRD patterns of **BIF-80** under different conditions .

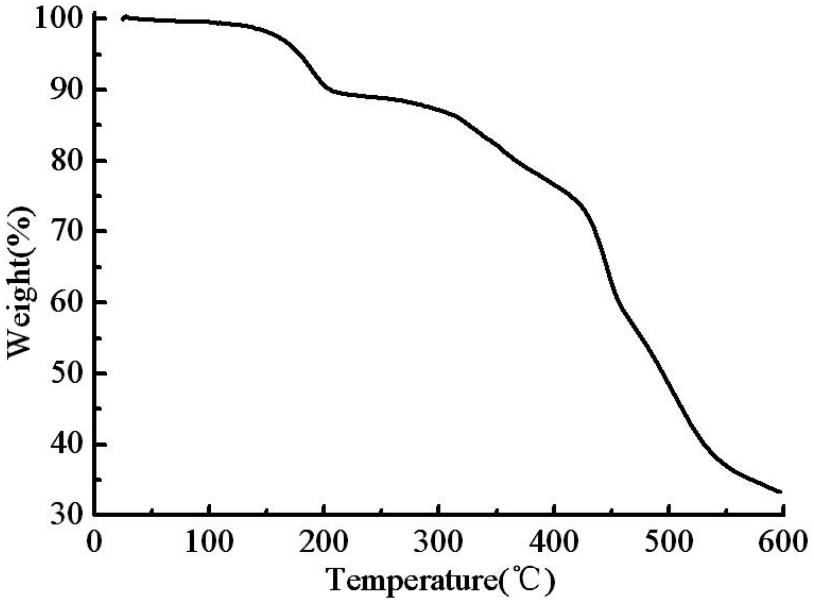

Fig. S2 The thermogravimetric analysis of **BIF-80**.

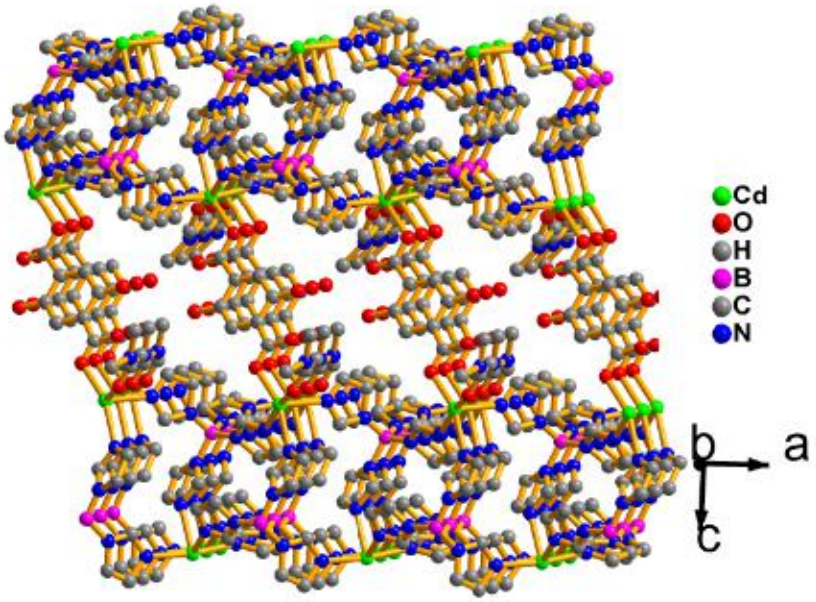

Fig. S3 The 3D packing structure of **BIF-80**.

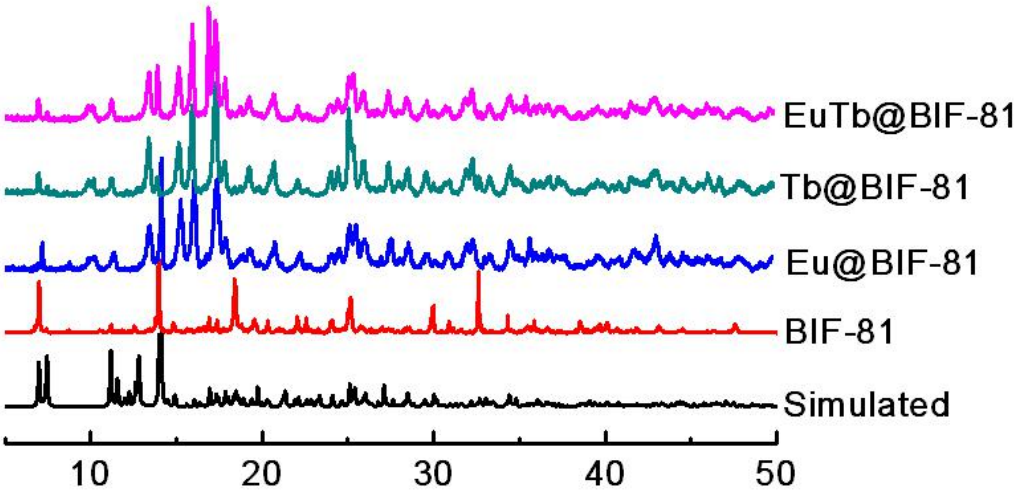

Fig. S4 The PXRD patterns of **BIF-81** under different conditions.

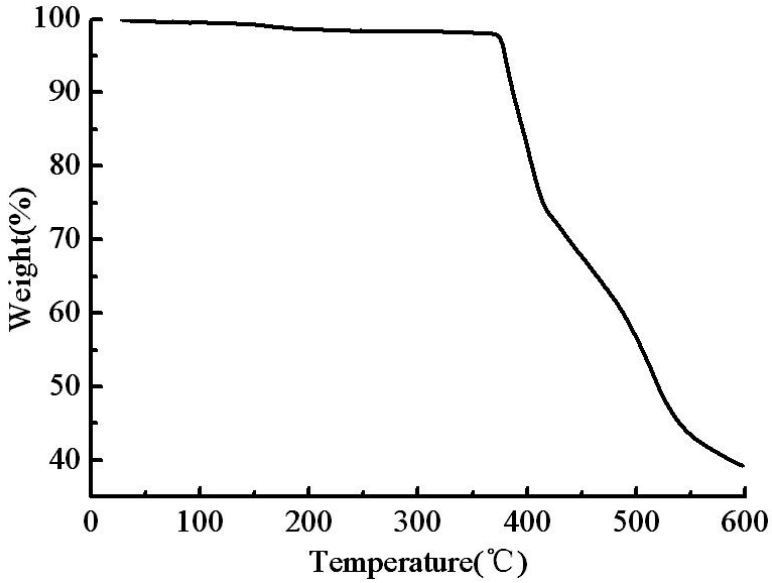

Fig. S5 Thermogravimetric analysis of **BIF-81** sample.

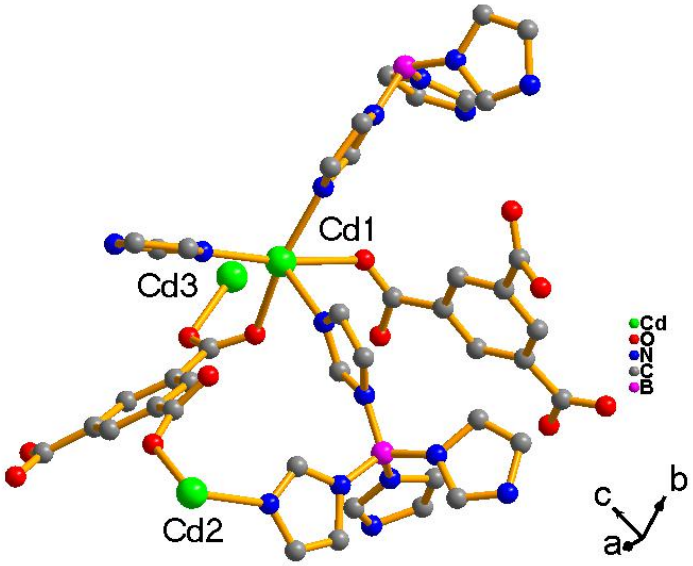

Fig. S6 The asymmetrical unit of **BIF-81** sample.

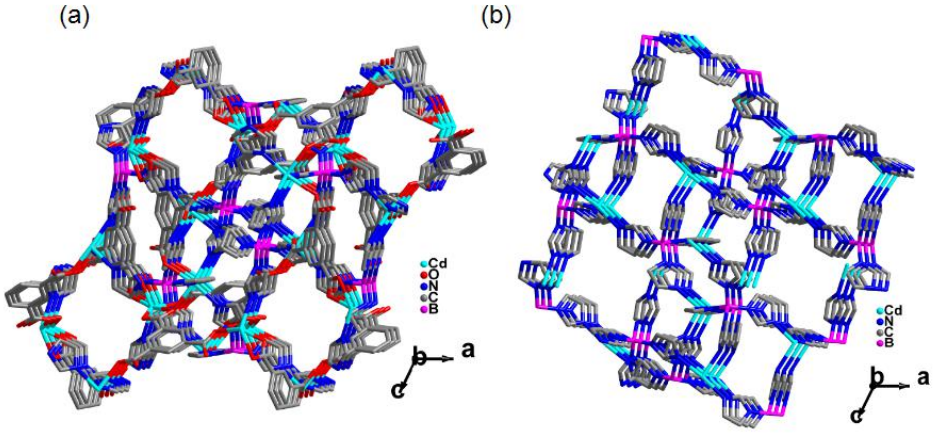

Fig. S7 (a) The 3D packing structure of **BIF-81**.(b) The 3D packing structure of **BIF-81** after omiting the BTC liagands.

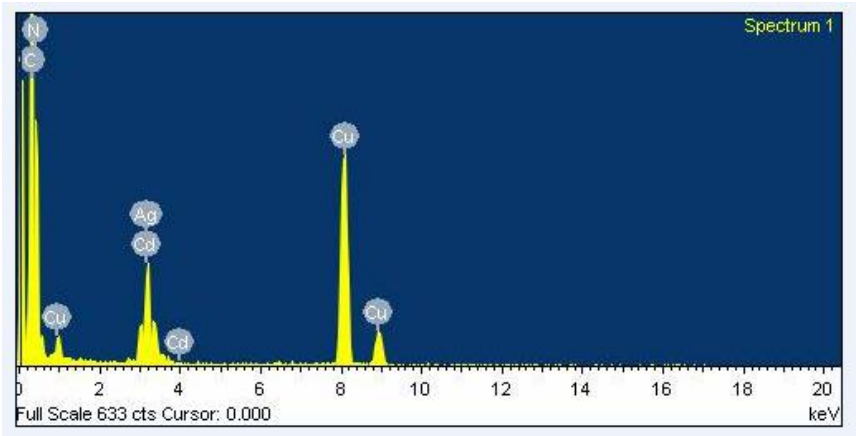

Fig. S8 The Energy-dispersive X-ray spectroscopy (EDS) of **Ag@BIF-80**. Meanwhile,inductively coupled plasma atomic emission spectroscopy (ICP-AES) showed a 3.16% and 19.96% weight percentage of Ag and Cd in the **BIF-80**, respectively.

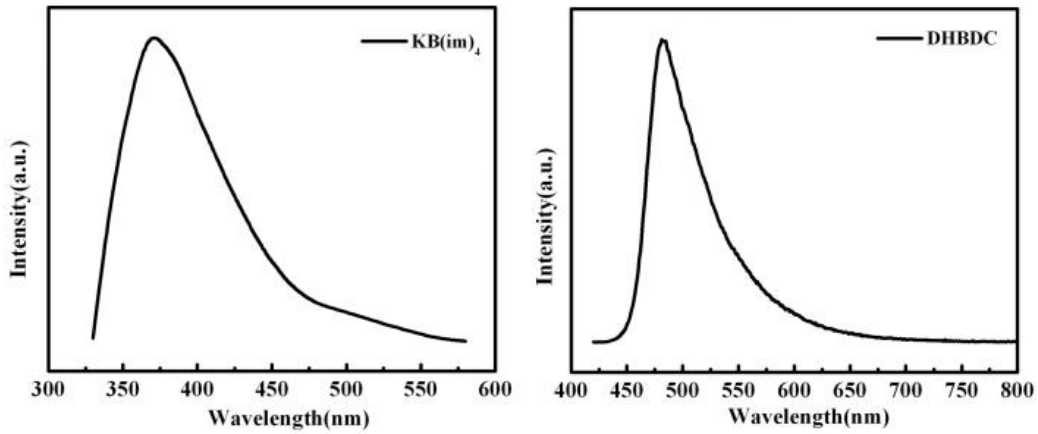

Fig. S9 The **e**mission spectra of boron imidazolate ligands (λex = 315 nm)and organic aromatic acid ligands(λex = 365 nm, DHBDC=2,5-dihydroxyterephthalic acid).

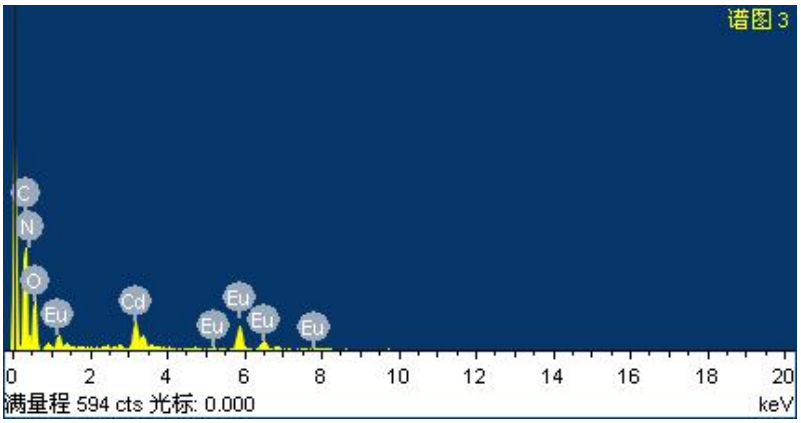

Fig. S10 The EDS spectra of **Eu@BIF-81**.

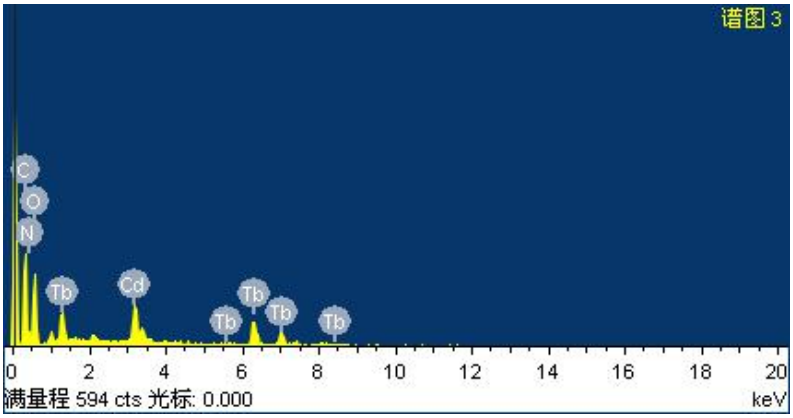

Fig. S11 The EDS spectra of **Tb@BIF-81**.

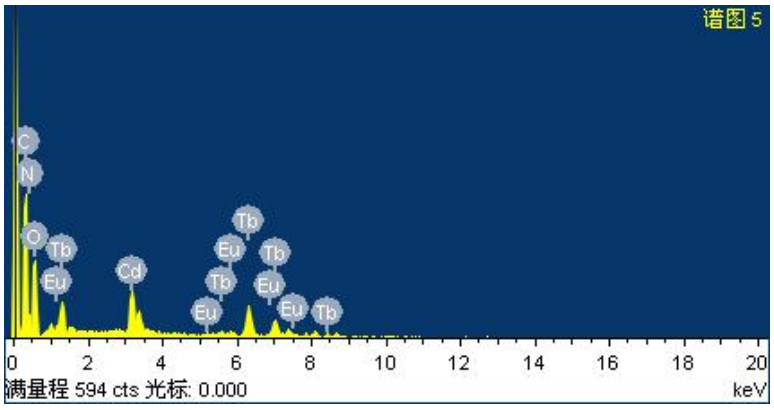

Fig. S12 The EDS spectra of **EuTb@BIF-81**.

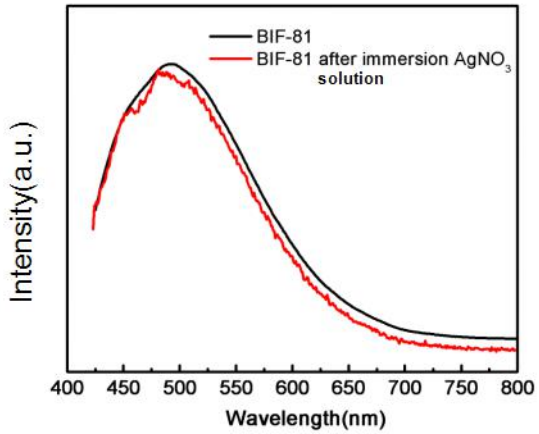

Fig. S13 Photoluminescent emission spectra of BIF-81 and BIF-81 after immersion $AgNO_3$ under excitation at 350nm.

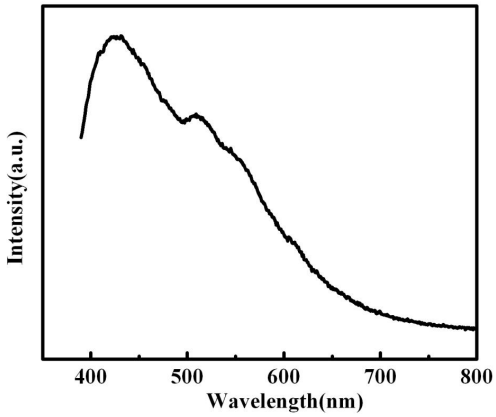

Fig. S14 The **e**mission spectra of 1, 3, 5-benzenetricarboxylic acid(λex = 365 nm).

The first reported anionic boron imidazolate framework (**BIF-81**) in the BIF systerm gives us a inspiration to tune photoluminescence emission by incorporating cationic ions like lanthanide ions. In order to dope lanthanide ions, fresh **BIF-81** (20 mg) were immersed in an aqueous solution of in nitrate salts aqueous solutions of Tb^{3+} and Eu^{3+} (1.5 $mmolL^{-1}$, 15 mL) for 8 hour at room temperature. As a result, we obtained the colorless crystal **Eu@BIF-81**, **Tb@BIF-81**, respectively. Moreover, the weight percentage of Eu^{3+} and Tb^{3+} doping into the **BIF-81** was confirmed by inductively coupled plasma spectroscopy. Their solid-state emission spectra were also charactered, exhibiting excellent unique peaks of Eu^{3+} and Tb^{3+}(Figure 3). So, it is very possible to realize trichromatic white-light emission by doping Eu^{3+} (red emission) and Tb^{3+} (green emission) into the **BIF-81** (blue emission). A similar process was employed to prepare Eu^{3+} and Tb^{3+} by adjusting different amounts of Tb^{3+} and Eu^{3+} (a-f: Table S1; g-i: to see manuscript). The molar ratios doped amount of Eu^{3+} and Tb^{3+} were checked by the ICP-AES(Table S2). The photoluminescence (PL) emission spectra of the **BIF-81** samples doped different amount of lanthanide ions were tested at

room temperature (a-f: Fig. S15). Luckly, when the fresh sample **BIF-81**(20 mg) were immersed i in nitrate salts aqueous solutions of Tb^{3+} and Eu^{3+} for 24 hour at room. The appropriate molar ratio of Eu^{3+}/Tb^{3+} (1/11)can be obtained a white-light emission under excitation at 300 nm (Figure 3).

Table S1. A series of **BIF-81** and immersioning different amount of Eu^{3+} and Tb^{3+} and colors with UV excitation at 365 nm.

	BIF-81	**Eu^{3+}**	**Tb^{3+}**	**color**
a	20mg	0.5ml	5ml	red
b	20mg	0.5ml	7ml	red
c	20mg	0.5ml	15ml	green
d	20mg	0.5ml	16ml	green
e	20mg	0.5ml	14ml	yellow-green
f	20mg	0.5ml	12ml	yellow-green
g	20mg	0 ml	0 ml	blue
h	20mg	15ml	0 ml	red
i	20mg	0 ml	15ml	green
j	20mg	0.5ml	10ml	white

Table S2. Molar ratios of multi-component $Eu^{3+}/Tb^{3+}/Cd^{2+}$ for samples a–f.

Sample	Eu	Tb	Cd
a	0.0074	0.0781	0.1063
b	0.0067	0.0779	0.1173
c	0.0064	0.0781	0.1186
d	0.0059	0.0746	0.1006
e	0.0053	0.0765	0.1233
f	0.0040	0.0753	0.1190
h	0.0902	0	0.1273
i	0	0.0962	0.1132
j	0.0076	0.0832	0.1023

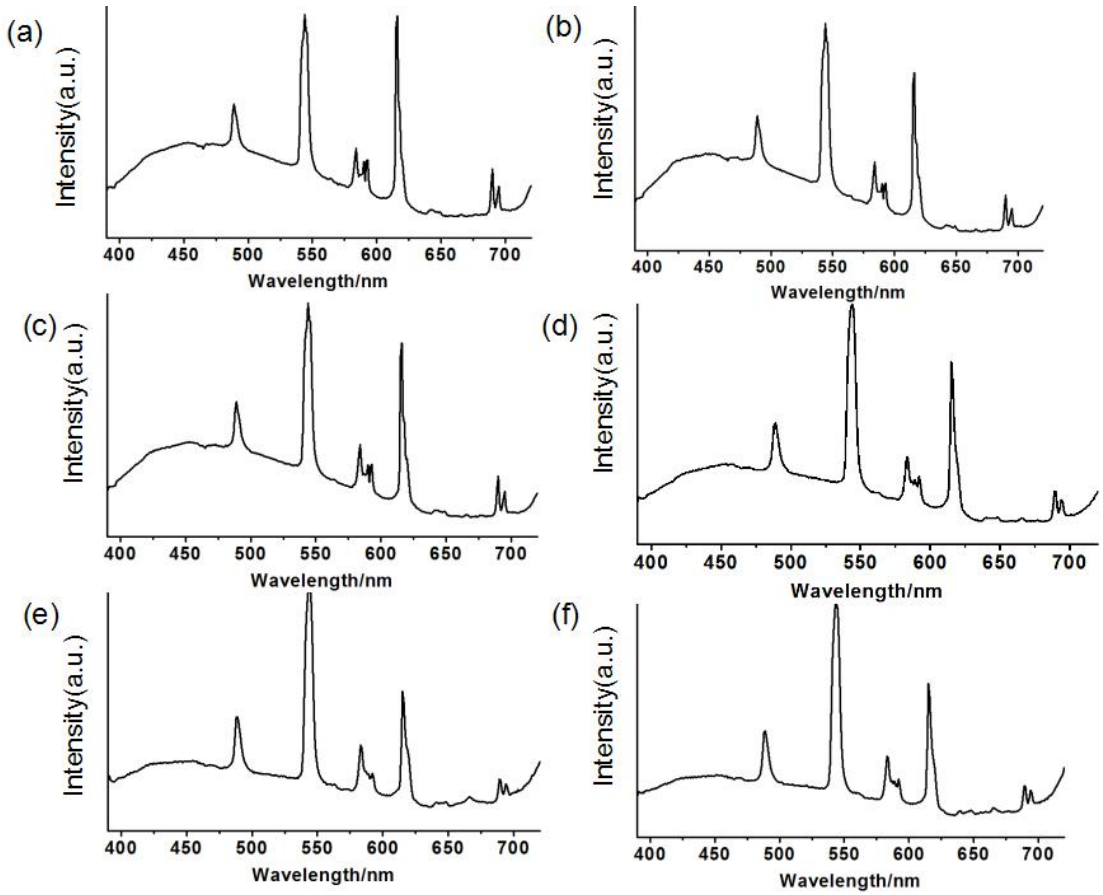

Fig. S15 **P**hotoluminescent emission spectra of **BIF-81** doped different ratio of Eu^{3+}/Tb^{3+} under excitation at 370nm.