Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting Information

Hydrothermal synthesis of Eu^{3+}-doped $BaMoO_4$ fluorescent probe for selectively detecting Fe^{3+} ions

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Table S1. The lattice constants of the obtained $BaMoO_4$: Eu^{3+} phosphors.

Sample	Lattice constant	
	a=*b* / Å	*c* / Å
$BaMoO_4$: 2 mol% Eu^{3+}	5.6010	12.830
$BaMoO_4$: 1.5 mol% Eu^{3+}	5.5974	12.839
$BaMoO_4$: 1 mol% Eu^{3+}	5.6060	12.837
$BaMoO_4$: 0.8 mol% Eu^{3+}	5.6094	12.838
$BaMoO_4$: 0.5 mol% Eu^{3+}	5.5959	12.828
JCPDS: 29-0193	5.5802	12.821

Table S2. Comparison of different methods.

Method	Production process	Instruments and medicines	Selectivity and Sensitivity	Response
Organic Fluorescent Probe[1]	Sophisticated	Expensive and Complex	High	Slower
Metal-Organic frameworks[2]	Complicated	Simple	High	Fast
Atomic Absorption Spectrometry(AAS)[3]	Cumbersome	Expensive and complex	High	Normal
$BaMoO_4$: Eu^{3+} phosphor[our present work]	Simple	Cheap and simple	High	Fast

1 Y. Guo, L. Wang, J. Zhuo, B. Xu, X. Li, J. Zhang, Z. Zhang, H. Chi, Y. Dong and G. Lu, A pyrene-based dual chemosensor for colorimetric detection of Cu^{2+} and fluorescent detection of Fe^{3+}. *Tetrahedron Letters,* **2017,** *58* (42), 3951-3956.

2 H. Guo, N. Wu, R. Xue, H. Liu, L. Li, M. Y. Wang, W. Q. Yao, Q. Li and W. Yang, Multifunctional Ln-MOF luminescent probe displaying superior capabilities for highly selective sensing of Fe^{3+} and Al^{3+} ions and nitrotoluene. *Colloids and Surfaces A: Physicochemical and Engineering Aspects,* **2020,** *585*.

3 M.Yaman and G.Kaya, Speciation of iron (II) and (III) by using solvent extraction and flame atomic absorption spectrometry. *Analytica Chimica Acta,* **2005,** *540* (1), 77-81.

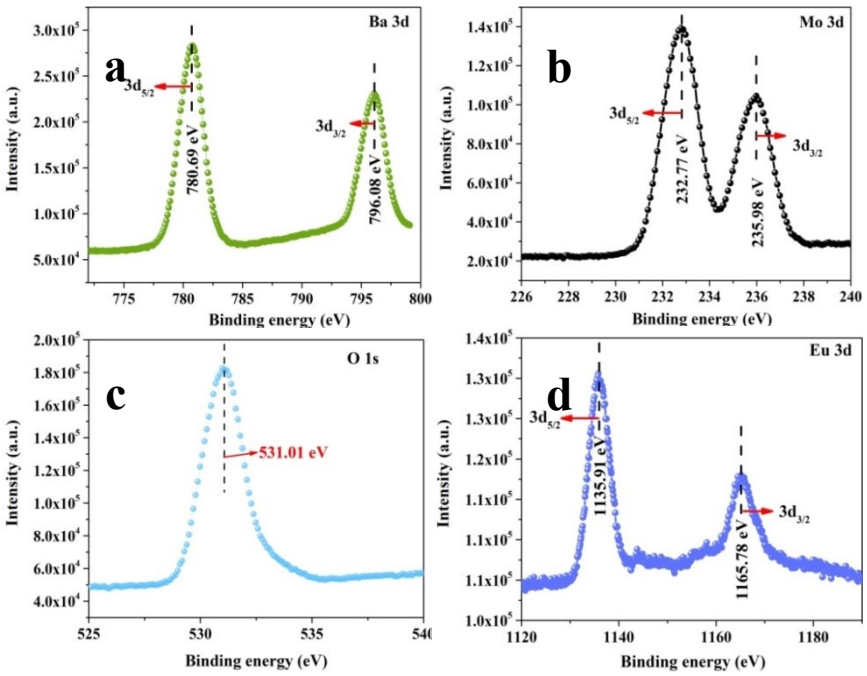

Figure S1. XPS of Ba 3d (a), Mo 3d (b), O 1s (c) and Eu 3d (d), respectively.

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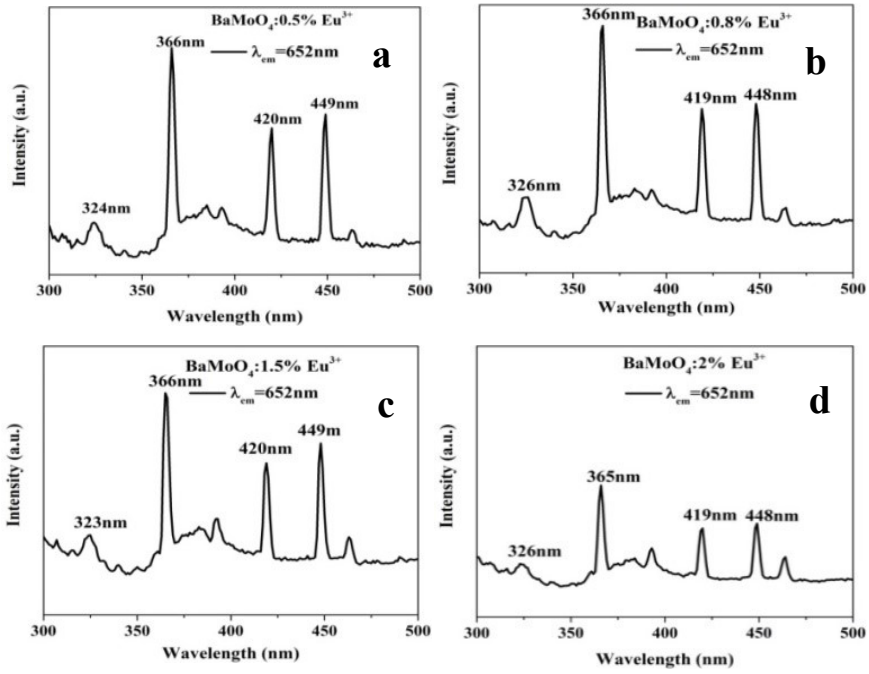

Figure S2. The excitation spectra of various concentrations of Eu^{3+}.

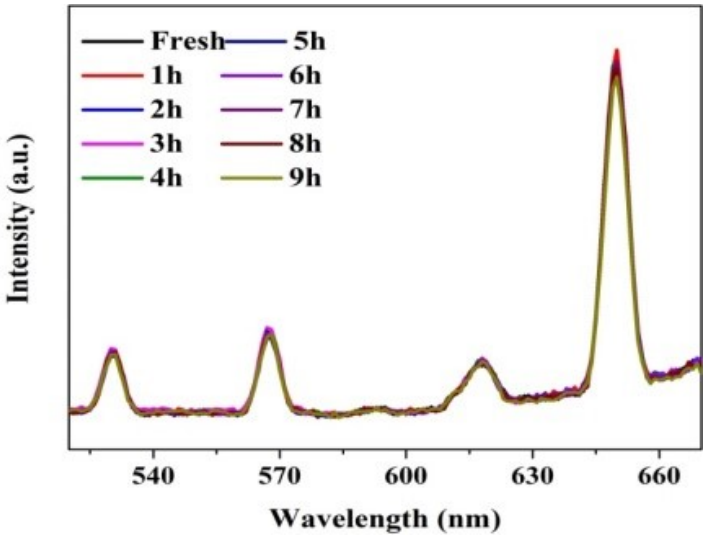

Figure S3. Hour-to-hour photostability of $BaMoO_4$: Eu^{3+} phosphors after immersing in aqueous solution for several hours.

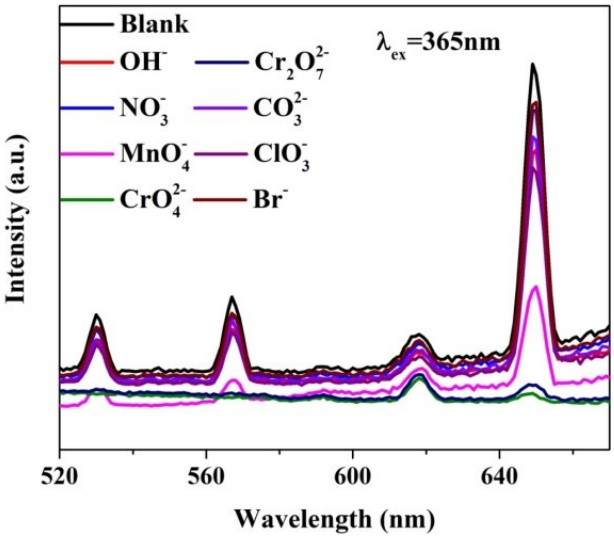

Figure S4. Emission spectra of $BaMoO_4$: Eu^{3+} suspensions after mixing with different anions.