

Highly sensitive and selective fluorescent probe for Ag^+ based on a Eu^{3+} post-functionalized metal-organic framework in aqueous media

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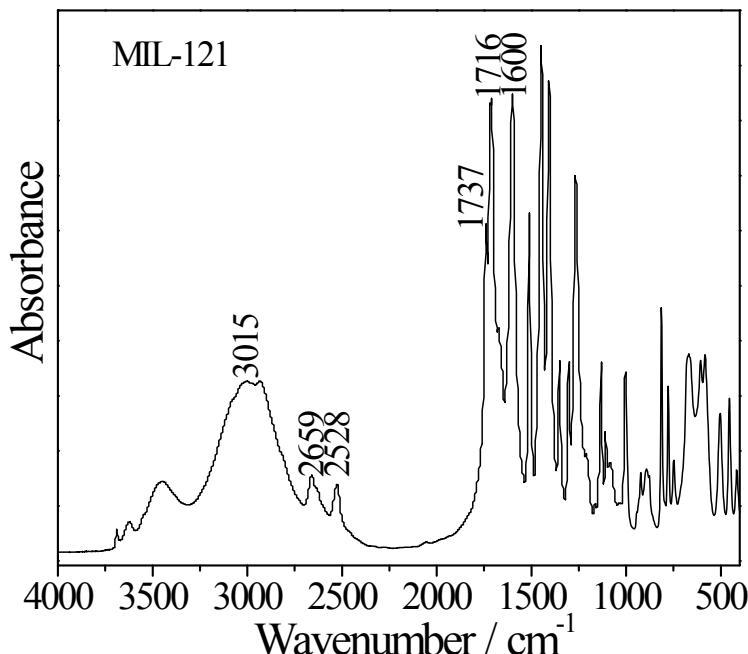


Figure S1 FTIR spectra of MIL-121.

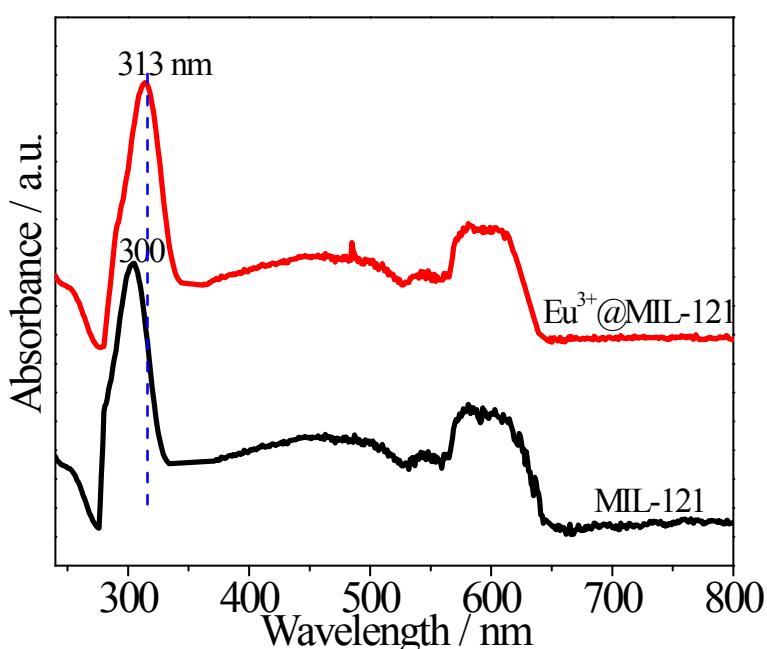


Figure S2 UV-vis absorption spectra of suspended MIL-121 and Eu^{3+} @MIL-121 in H_2O solution. The absorption band at 300 nm is assigned to $\pi-\pi^*$ transitions of the ligands in MIL-121. The absorption bands in the visible region ($\lambda=550-650 \text{ nm}$) are relatively wide, which should be caused by metal-to-ligand charge transition (MLCT).¹

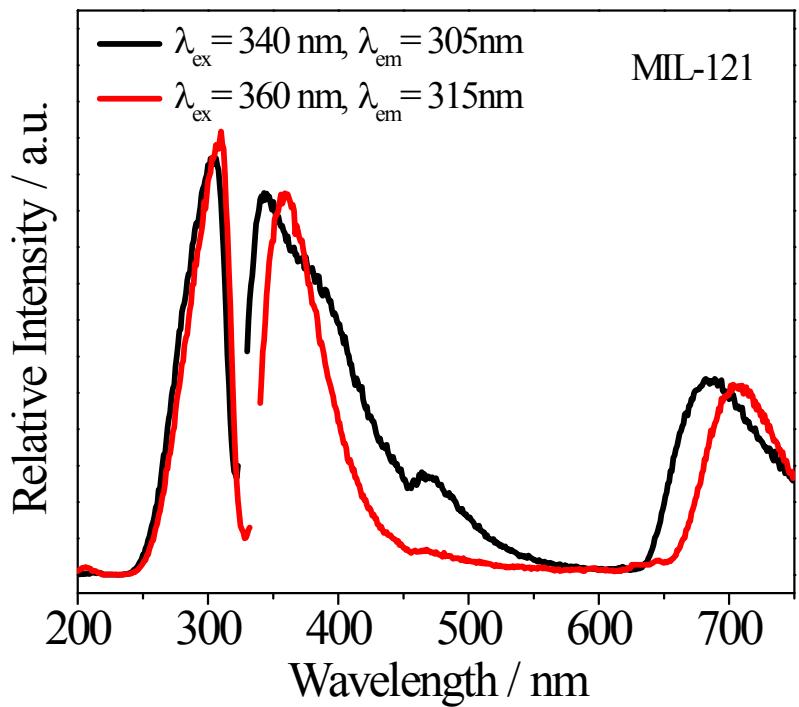


Figure S3 Excitation and emission spectra of MIL-121.

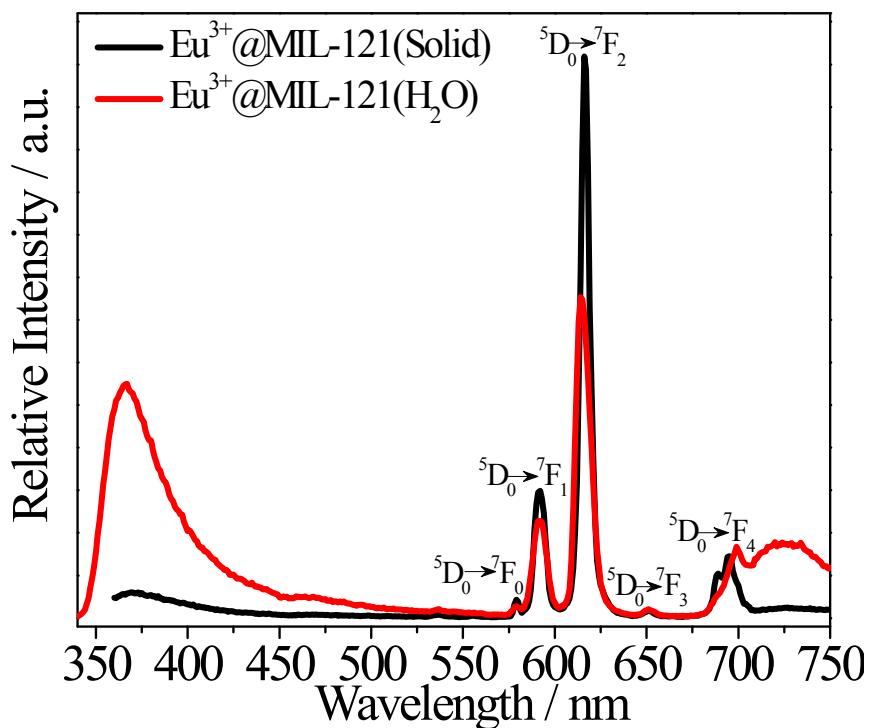


Figure S4 Comparison of the PL spectra of $\text{Eu}^{3+}@\text{MIL-121}$ in solid state (black) and in suspension state (red)

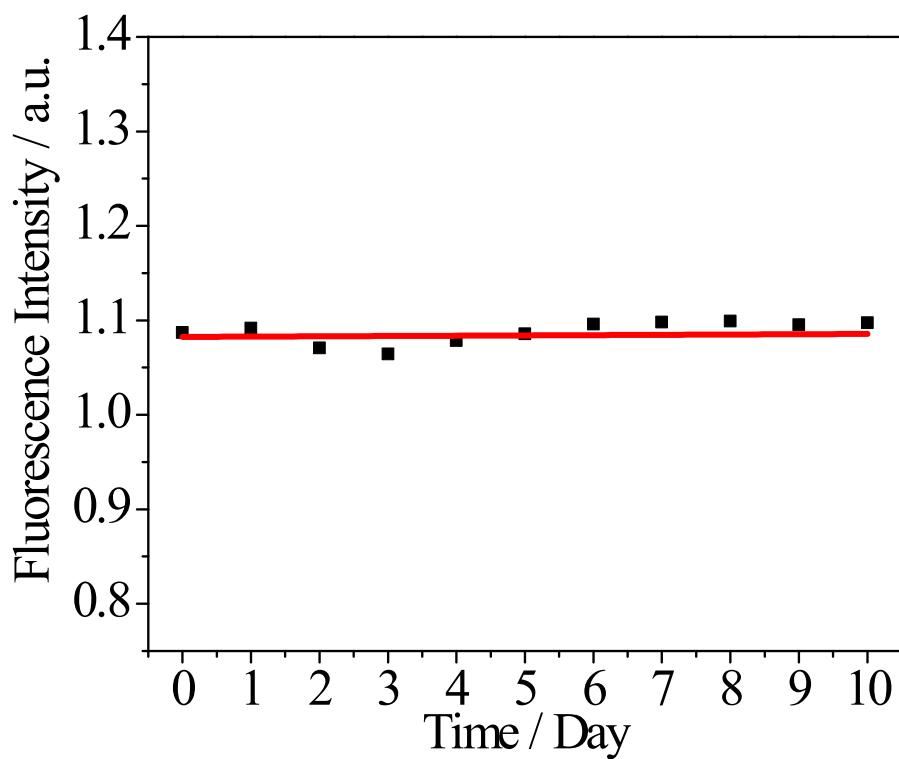


Figure S5 Day-to day fluorescence stability of Eu^{3+} @MIL-121 in aqueous solution.

Table S1 Response of luminescence lifetime of Eu^{3+} @MIL-121 towards aqueous solutions of various metal cations

Compounds	Luminescence lifetimes (μs)
Ag^+	975
K^+	211
Ca^{2+}	204
Na^+	196
Cd^{2+}	200
Origin	206
Mg^{2+}	192
Zn^{2+}	186
Hg^{2+}	167
Mn^{2+}	314
Pb^{2+}	325
Ni^{2+}	120
Co^{2+}	132
Al^{3+}	126
Cu^{2+}	84
Cr^{3+}	122
Fe^{3+}	undetectable

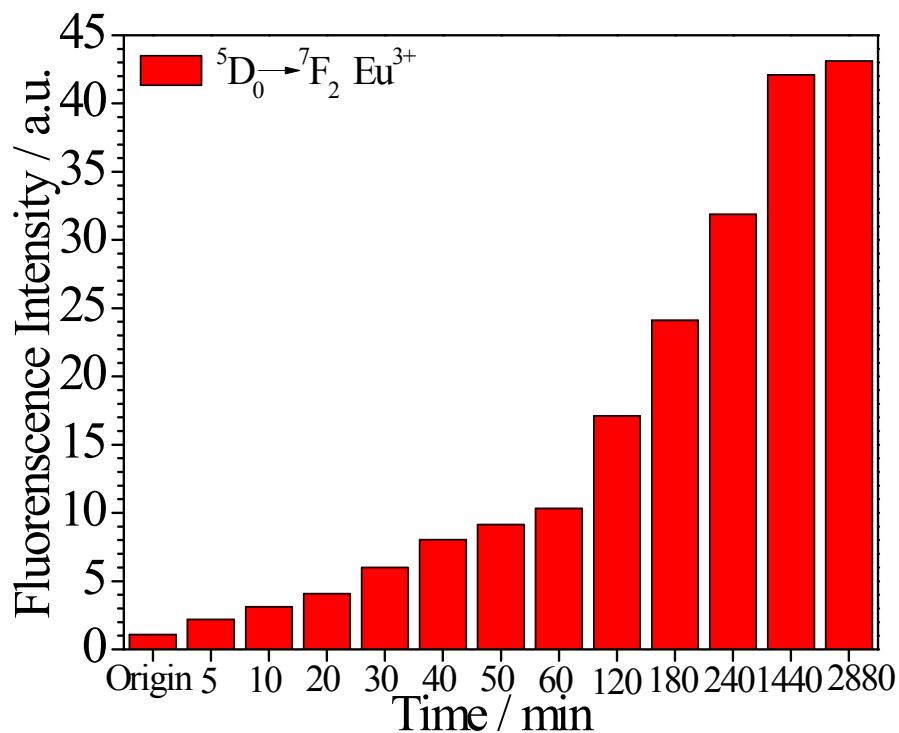


Figure S6 Comparison of the emission intensity of Eu^{3+} @MIL-121 samples in Ag^+ aqueous obtained at different interaction times, $\lambda_{\text{ex}} = 315 \text{ nm}$.

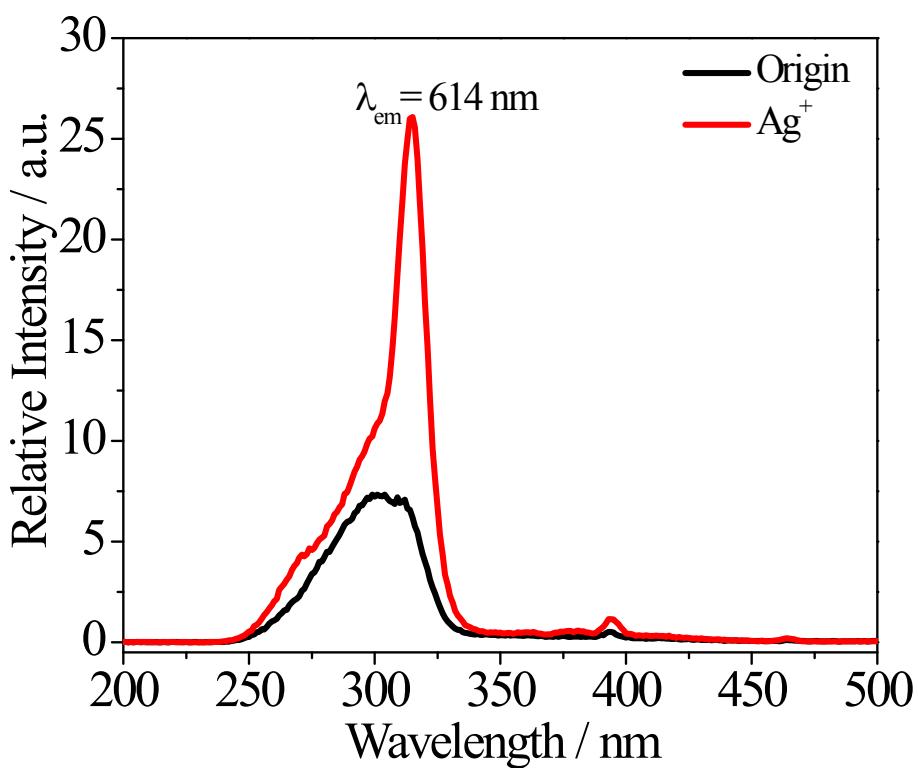


Figure S7 The excitation spectra of Eu^{3+} @MIL-121 in the absence (black) and presence of Ag^+ (red) in aqueous solution.

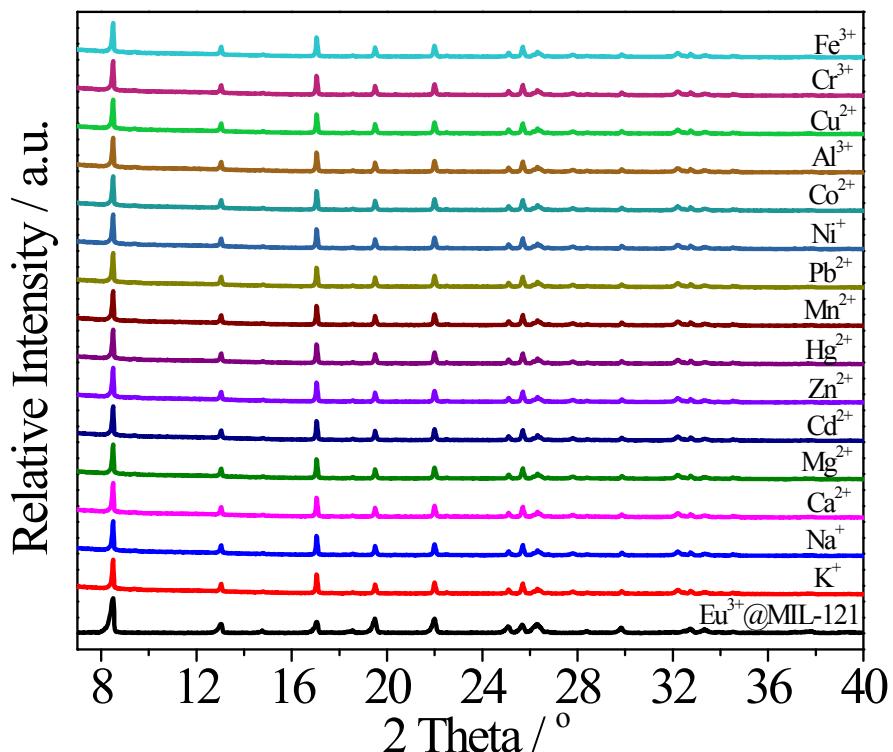


Figure S8 PXRD patterns of the $\text{Eu}^{3+}@\text{MIL-121}$ after immersing in aqueous solutions with various metal ions.

References

- 1 J. Jin, X. Han, Q. Meng, D. Li, Y. X. Chi and S. Y. Niu, *J. Solid. State. Chem.*, 2013, **197**, 92.