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Supporting Information

Tb(III)-Functionalized MOF Hybridized Bis-crosslinked Networked Hydrogel Luminescent Films for Arginine and Dopamine Hydrochloride Sensing and Anticounterfeiting

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1. Instruments

Fourier transform infrared (FT-IR) spectra were obtained by using the SPECTRUM 100 instrument provided by PerkinElmer, employing the KBr pellet Pressing method. X-ray photoelectron spectroscopy (XPS) analysis was conducted using the K-Alpha+ instrument from Thermo Fisher Scientific. The X-ray source utilized was a monochromatic Al Kα source. Scanning electron microscopy (SEM) measurements and energy-dispersive spectroscopy (EDS) were performed using a Sigma 300 instrument with an accelerating voltage of 10 kV. The RF-5301 fluorescence spectrophotometer provided by Shimadzu Corporation, Japan, was employed to acquire excitation and emission spectra. A steady-state transient fluorescence spectrometer (Edinburgh FLS1000) was used to obtain the fluorescence lifetime and quantum yield data. X-ray diffraction (XRD) analysis utilized a BRUKER-supplied D8 ADVANCE instrument with monochromatic Cu Kα excitation. Data were acquired at a 2° min^{-1} scanning rate within the 5° < 2θ < 25° range. A steady-state transient fluorescence spectrometer (Edinburgh FLS1000) was used to obtain the fluorescence lifetime and quantum yield data.

2.Supporting Figures and Tables

a b

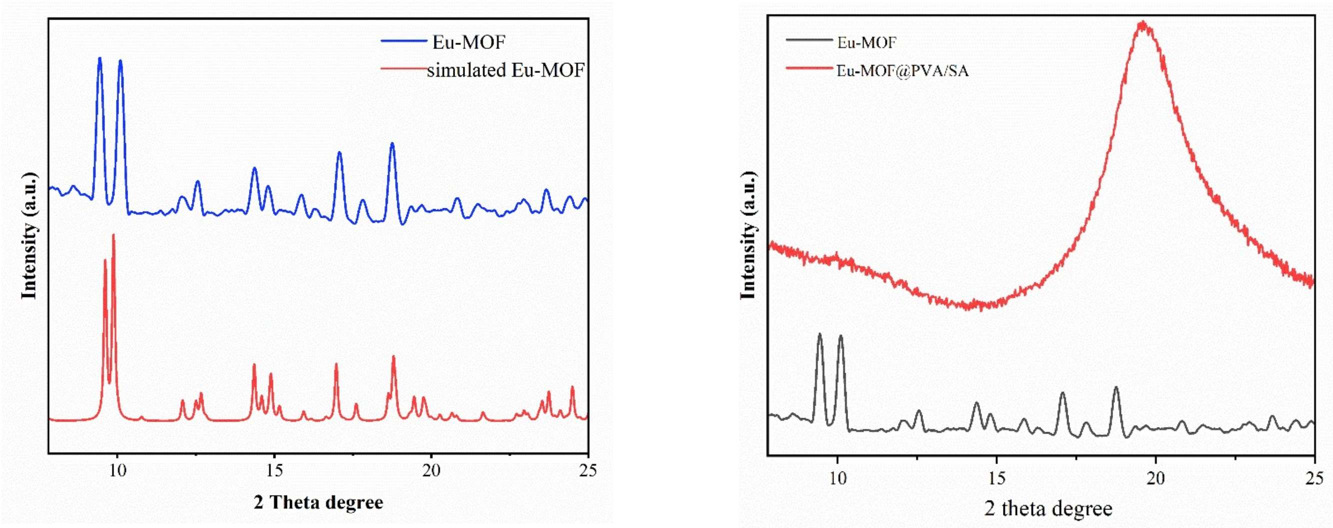

Figure S1(a) XRD patterns of Eu-MOF and Simulated Eu-MOF. (b)Eu-MOF@PVA/SA and Eu-MOF

a b

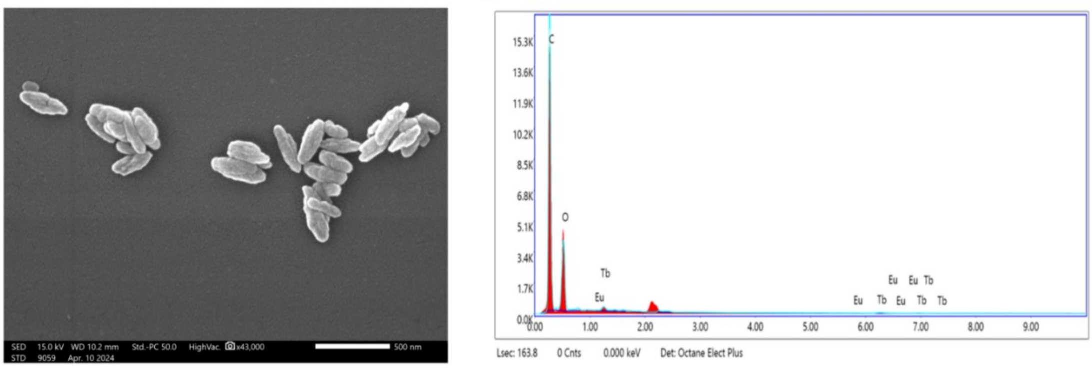

Figure S2 (a). SEM picture of Eu-MOF, (b). EDS energy spectra of Tb@Eu-MOF@PVA/SA

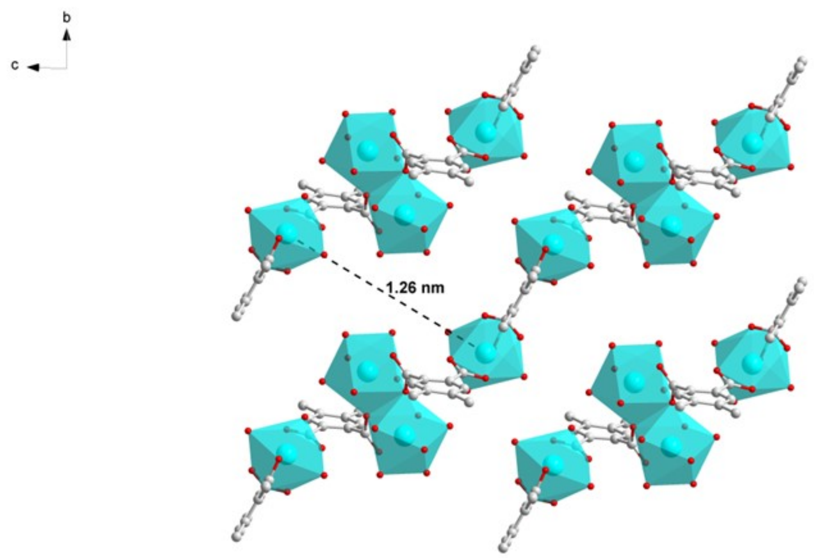

Figure S3: the simulated 3D structure of Eu-MOF (CCDC:862207)

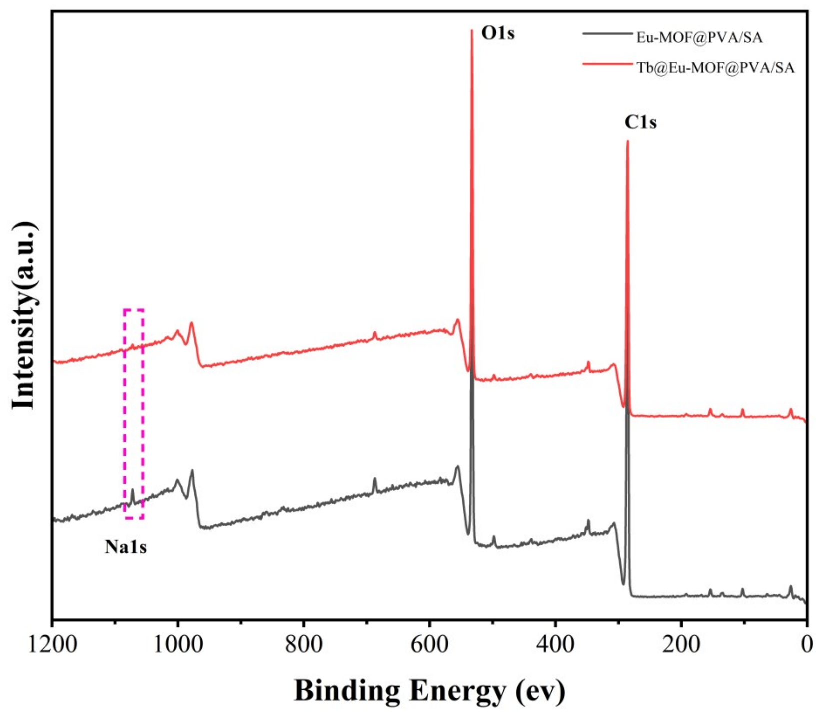

Figure S4 XPS spectra of Eu-MOF@PVA/SA and Tb@Eu-MOF@PVA/SA

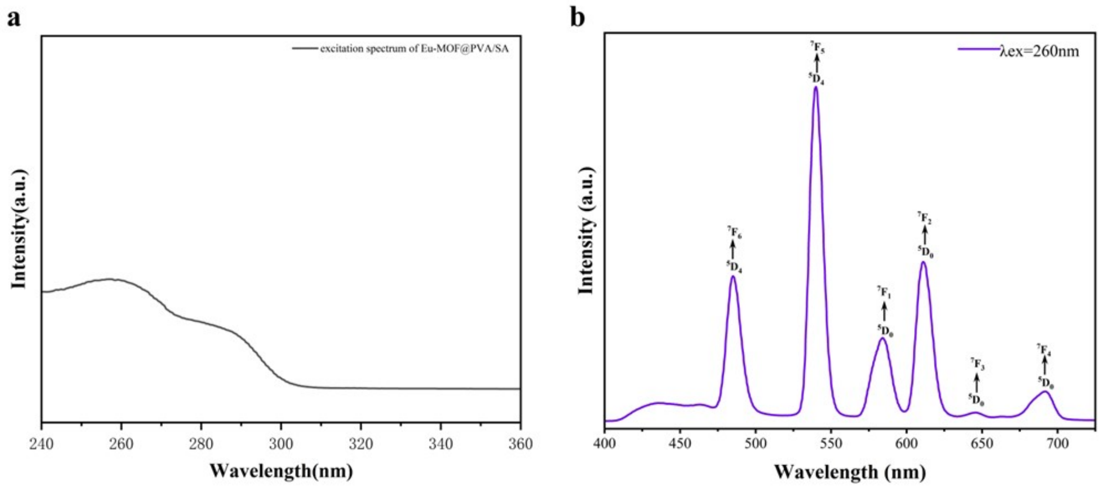

Figure S5. (a) Excitation spectra of Eu-MOF@PVA/SA, (b) The emission spectrum of Tb@Eu-MOF@PVA/SA (λex = 260 nm).

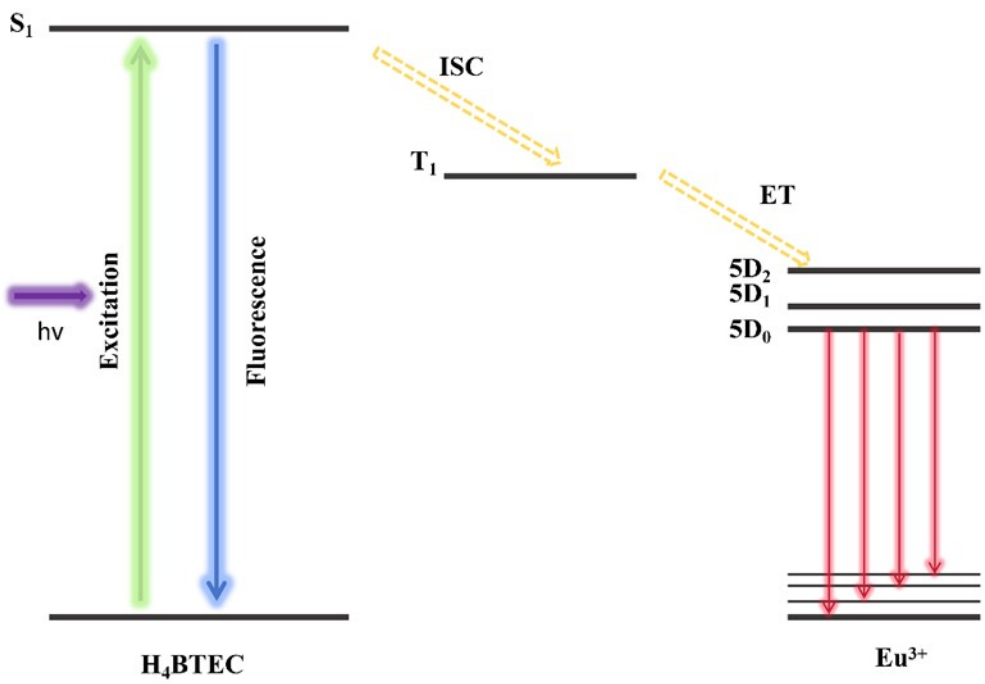

Figure S6 Jablonsky level diagrams of Eu-MOF.

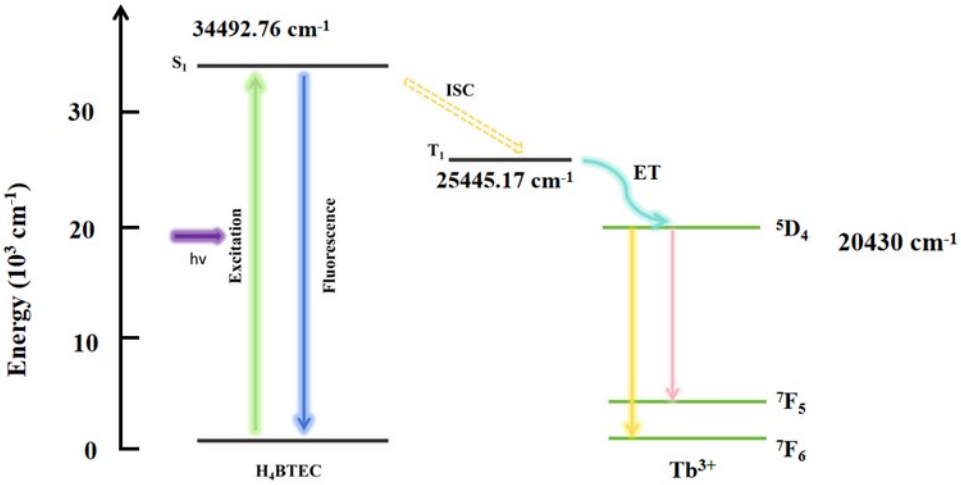

Figure S7 schematic diagram of the antenna effect of the ligand with Tb3⁺

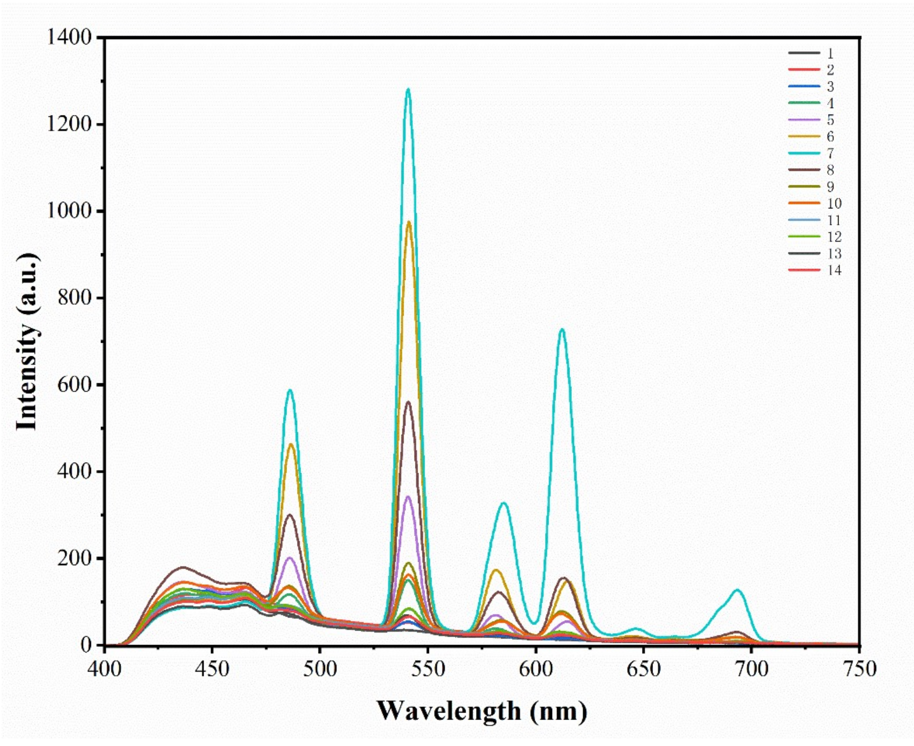

Figure S8 Comparison of fluorescence intensity of Tb@Eu-MOF@PVA/SA in different PH solutions.

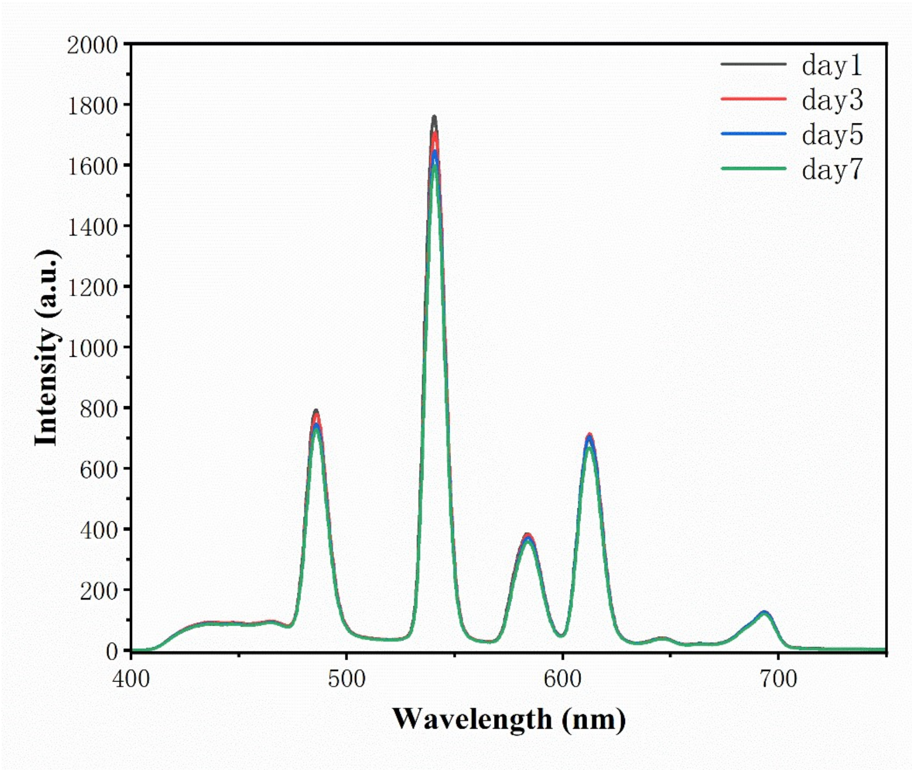

Figure S9 The fluorescence changes of Tb@Eu-MOF@PVA/SA on days 1, 3, 5, and 7in the air at room temperature.

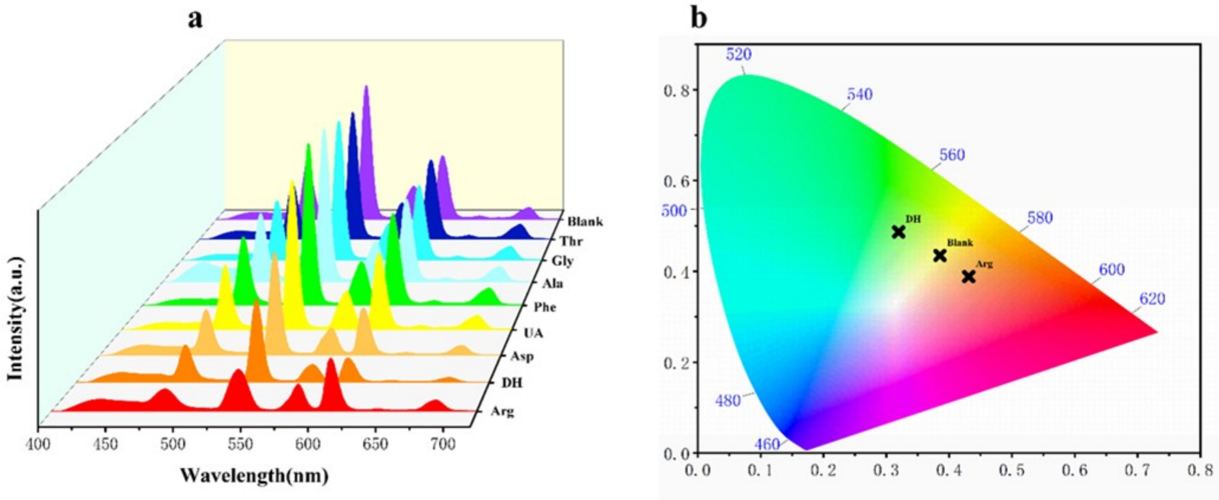

Figure S10 (a) Emission spectra (λex = 260 nm) of Tb@Eu-MOF@PVA/SA in various species solution (1mM), (b) the corresponding CIE coordinates of Tb@Eu-MOF@PVA/SA in Arg or DH solution

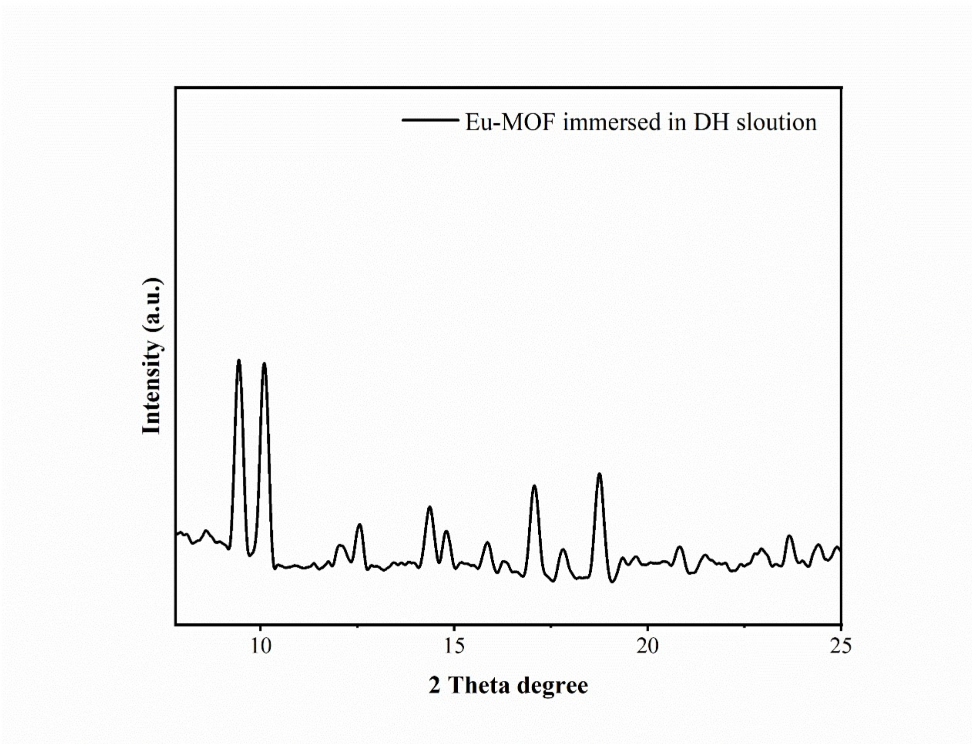

Figure S11 The XRD patterns of Eu-MOF with the DH treatment

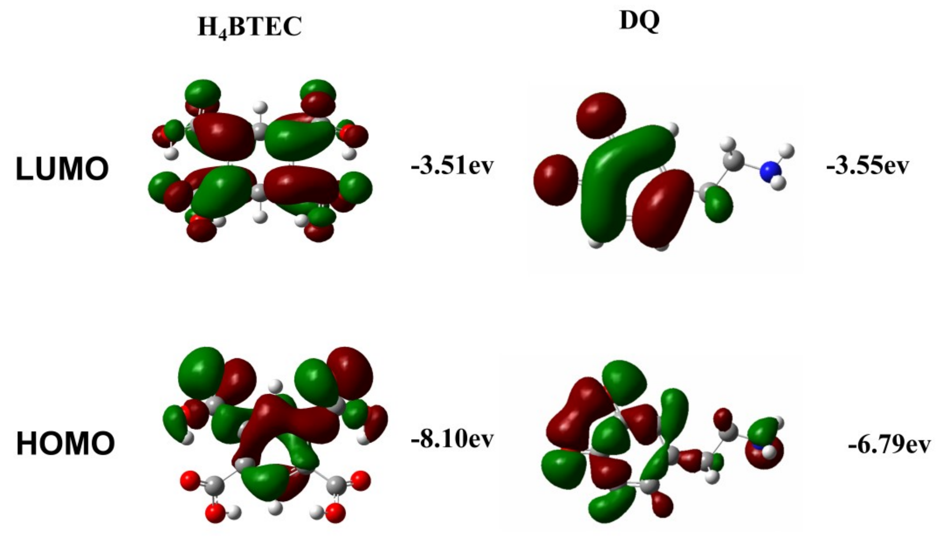

Figure S12 LUMO and HOMO orbitals of the H_4BTEC and DQ model.

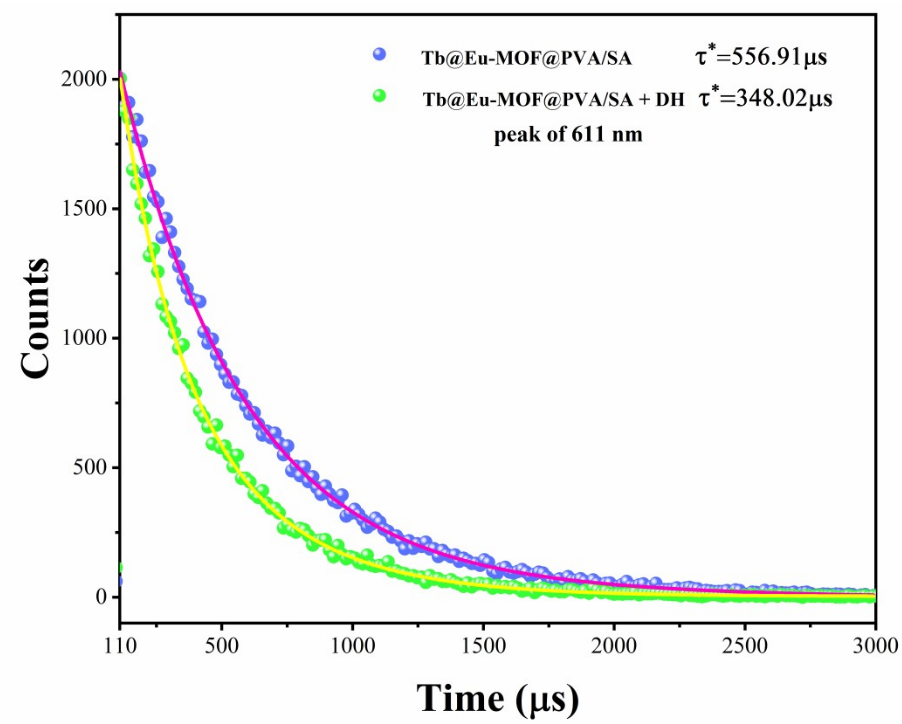

Figure S13 Lifetime decay curves of Tb@Eu-MOF@PVA/SA at 611 nm in the absence and presence of DH

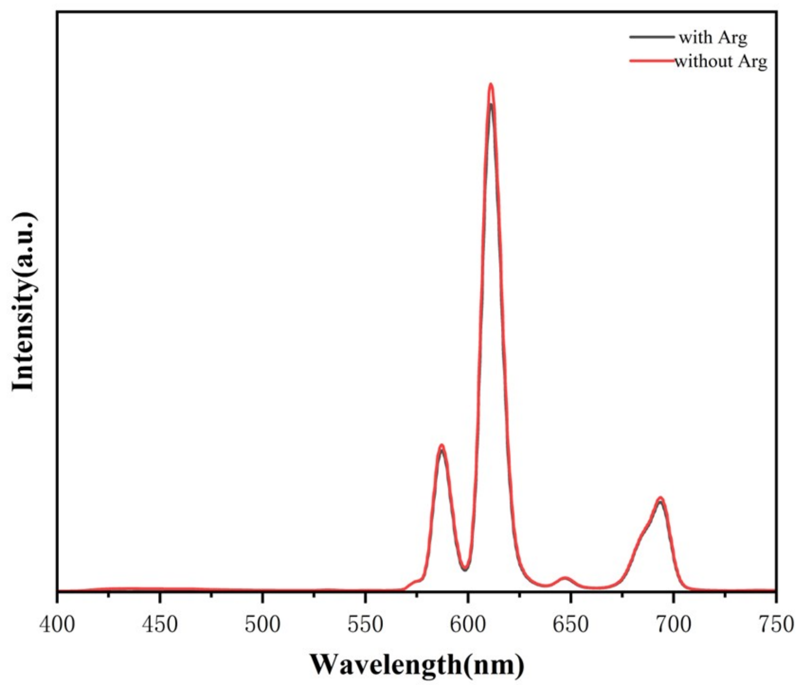

Figure S14 Emission spectra (λex = 260 nm) of Eu-MOF with Arg and without Arg

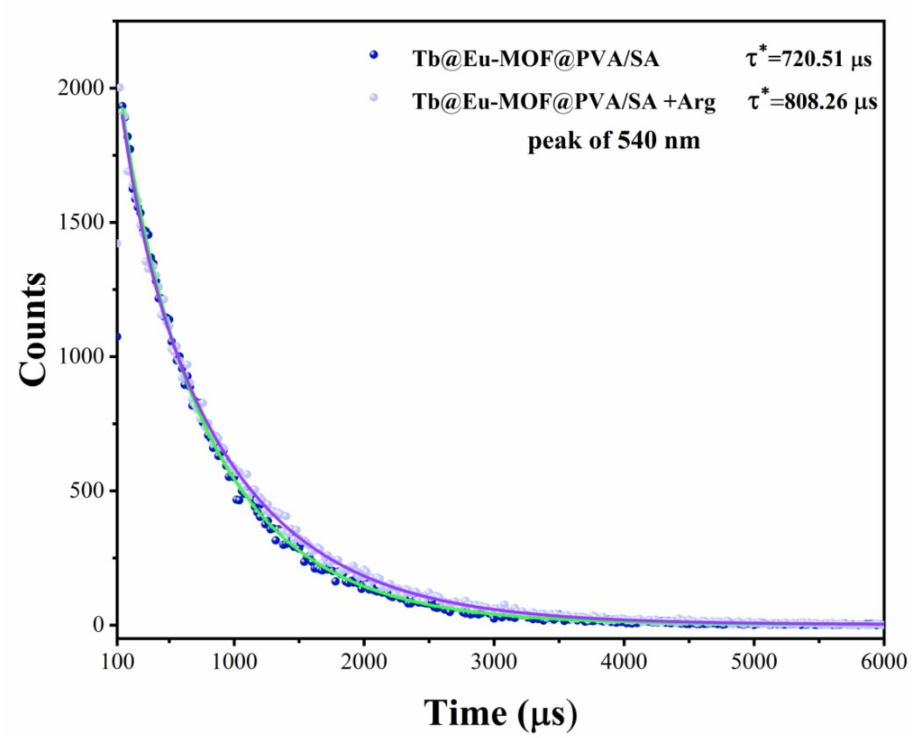

Figure S15 Lifetime decay curves of Tb@Eu-MOF@PVA/SA at 540 nm in the absence and presence of Arg

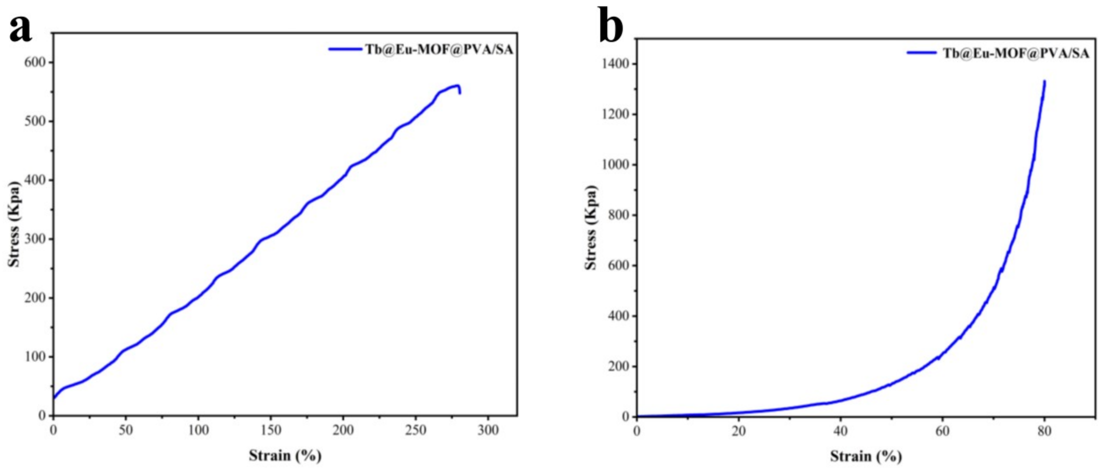

Figure S16 (a)Tensile stress-strain curve of Tb@Eu-MOF@PVA/SA, (b)Stress-strain curve of Tb@Eu-MOF@PVA/SA at 80 % compression variable

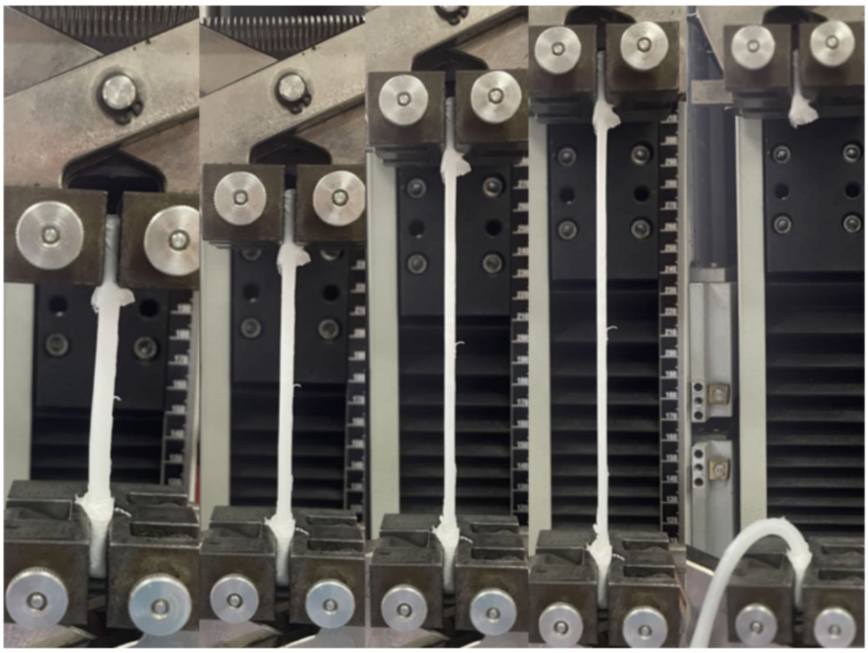

Figure S17 photos of Tb@Eu-MOF@PVA/SA stretching process.

Original Compress of 80% Recovery

Figure S18 photos of Tb@Eu-MOF@PVA/SA compression and recovery process

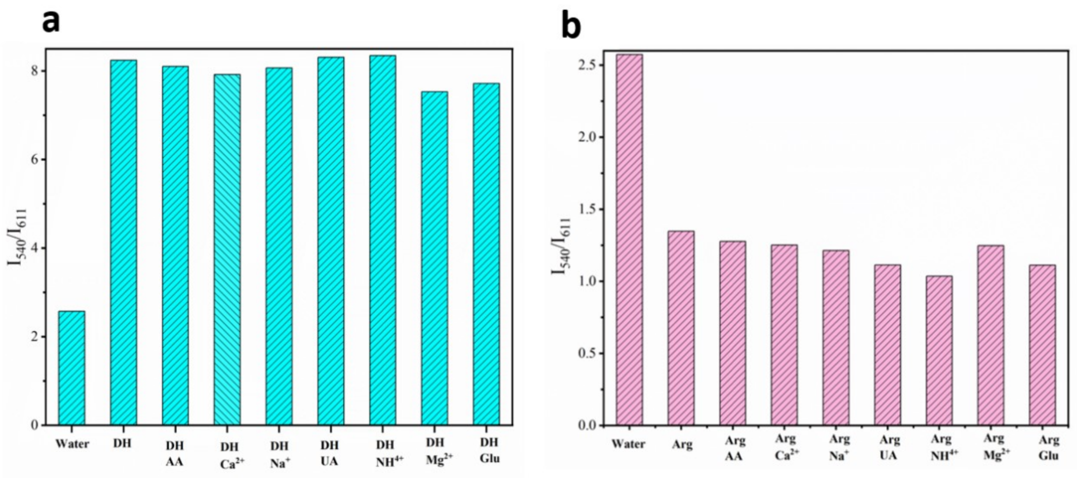

Figure S19: The anti-interference performance of Tb@Eu-MOF@PVA/SA for (a)DH detection and (b)Ar

Table S1 Analysis report of the EDS energy spectra of Tb@Eu-MOF@PVA/SA.

Material	Element	Weight%
	C	69.58
	O	23.31
	Eu	1.09
Tb@Eu-MOF@PVA/SA	Tb	6.02