Electronic Supplementary Material (ESI) for Analytical Methods

Supporting information *for*

Polyurethane-based Eu(III) luminescent foam as sensor for recognizing Cu^{2+} in water

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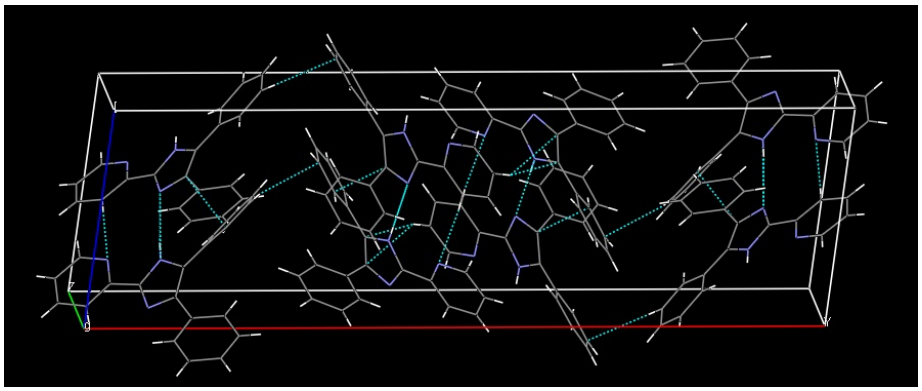

Figure S1. The crystal structure of ligand (**L**).

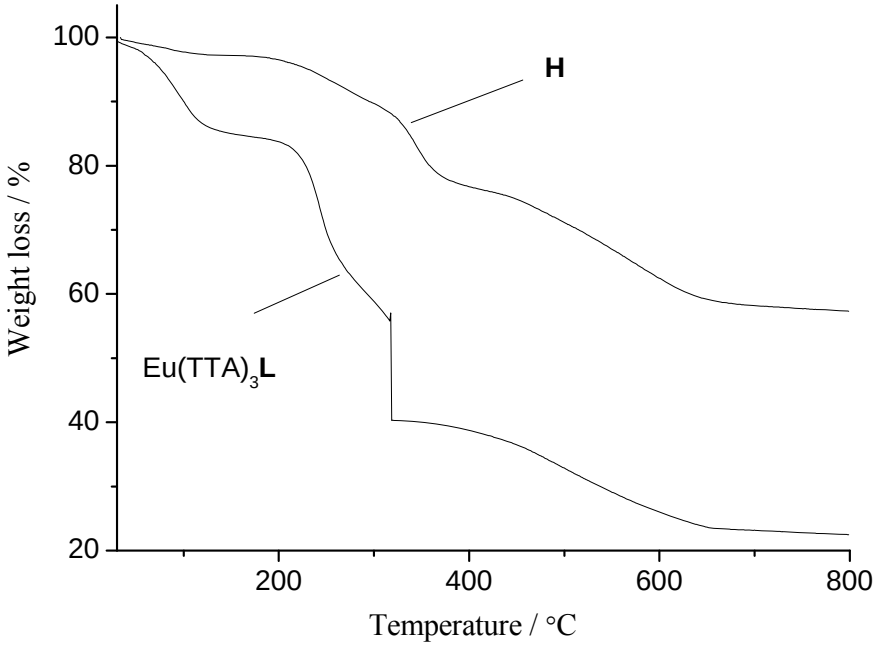

Figure S2. Thermogravimetric analysis traces of $Eu(TTA)_3$**L** and **H**.

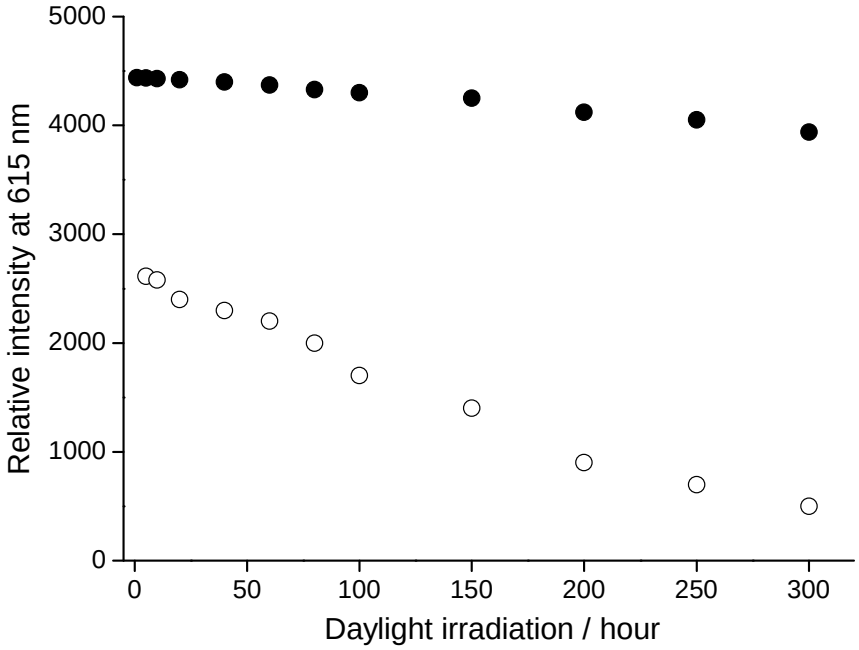

Figure S3. Emission intensity of **H** (full circle)and $Eu(TTA)_3$**L** (empty circle) at 615 nm under daylight-irradiation.

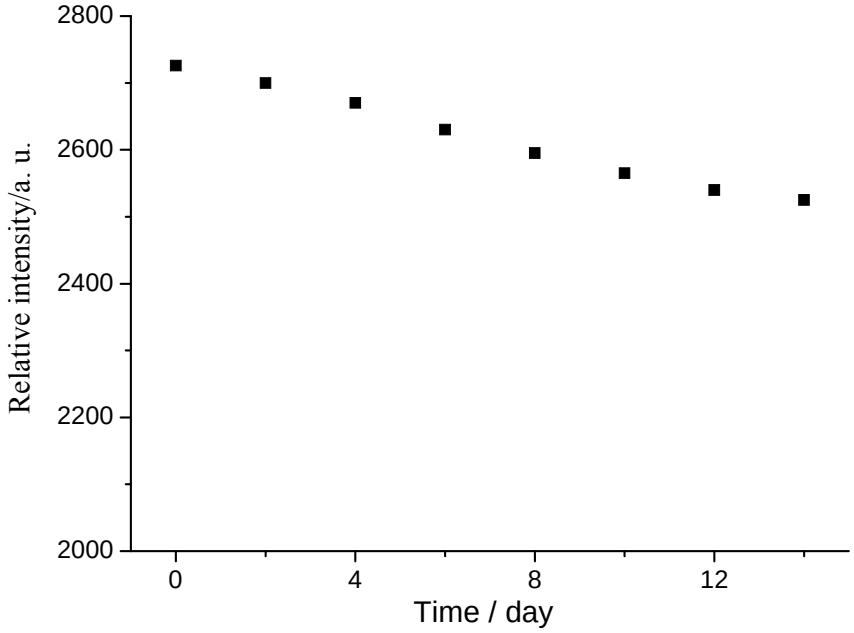

Figure S4. Dependence of peak intensity of $^5D_0 \rightarrow {}^7F_2$ transition of Eu-PUF on the extraction time in water.

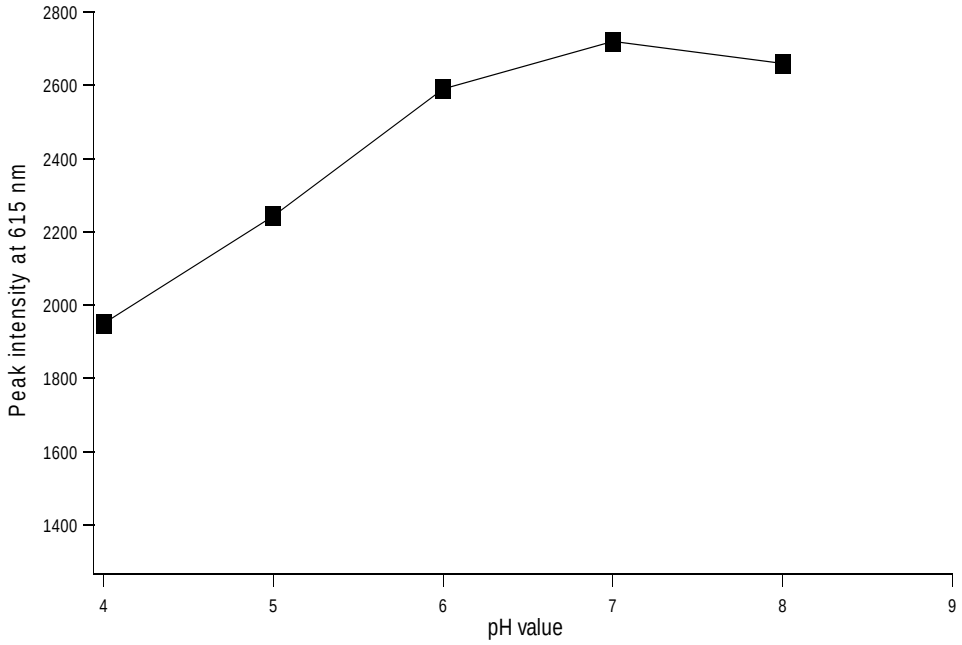

Figure S5 Emission peak intensities of Eu-PUF at different pH values.

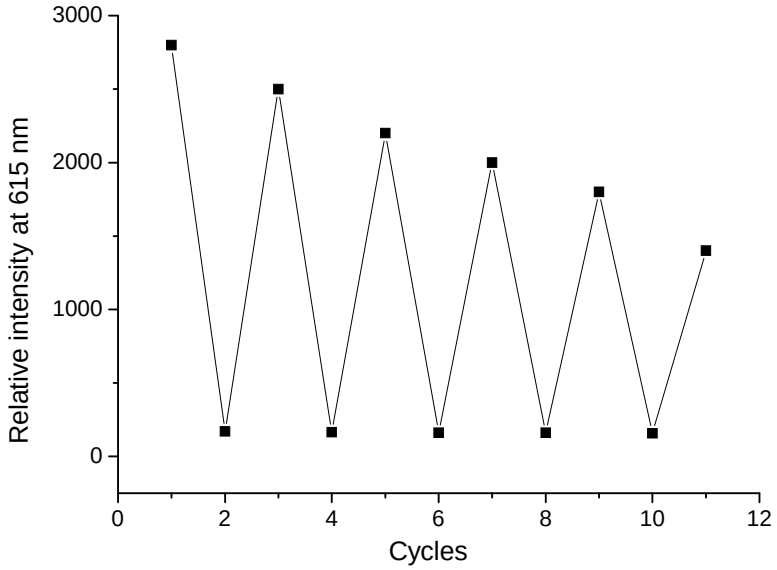

Figure S6. Graph of the fluorescence peak intensity of **H** at 615 nm versus alternate dipping into 5×10^{-4} M of copper ions in water.

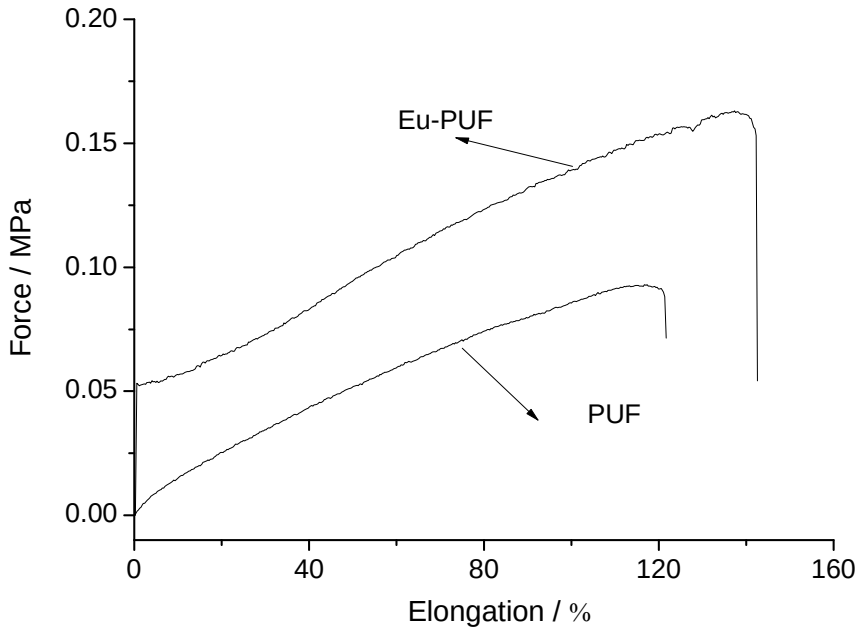

Figure S7. The tensile curves of Eu-PUF and pure PUF.

Table S1 Bond lengths [A] for ligand (**L**)

C9 C10 1.382(5)	C15 N1 1.352	C31 C32 1.376(5)
C9 C14 1.397(5)	C15 C16 1.458	C31 H31 0.9300
C9 C8 1.461(5)	N5 C20 1.338	C24 C25 1.385(5)
C8 C7 1.375(5)	N5 C16 1.344	C24 H24 0.9300
C8 N1 1.382(4)	C16 C17 1.380	C22 H22 0.9300
C7 N2 1.391(4)	C18 C19 1.374	C34 C33 1.366(5)
C7 C2 1.480(5)	C18 C17 1.380	C34 H34 0.9300
C2 C1 1.381(5)	C18 H18 0.9300	C25 H25 0.9300
C2 C3 1.384(5)	C17 H17 0.9300	C33 C32 1.372(5)
C11 C12 1.376(6)	C19 C20 1.359(6)	C33 H33 0.9300
C11 C10 1.378(5)	C19 H19 0.9300	C32 H32 0.9300
C11 H11 0.9300	C20 H20 0.9300	C36 N3 1.319(4)
C1 C6 1.385(5)	C26 C27 1.381(5)	C36 N4 1.356(4)
C1 H1 0.9300	C26 C25 1.386(5)	C36 C37 1.459(5)
C3 C4 1.383(5)	C26 C28 1.475(5)	C37 N6 1.343(4)
C3 H3 0.9300	C29 C28 1.373(5)	C37 C38 1.378(5)
C10 H10 0.9300	C29 N4 1.382(4)	N6 C41 1.343(5)
C14 C13 1.370(6)	C29 C30 1.465(5)	C38 C39 1.384(5)
C14 H14 0.9300	C30 C35 1.387(5)	C38 H38 0.9300
C12 C13 1.371(6)	C30 C31 1.389(5)	C39 C40 1.354(6)
C12 H12 0.9300	C28 N3 1.394(4)	C39 H39 0.9300
C13 H13 0.9300	C27 C22 1.383(5)	C40 C41 1.359(5)

C4 C5 1.379(6)	C27 H27 0.9300	C40 H40 0.9300
C4 H4 0.9300	C35 C34 1.382(5)	C41 H41 0.9300
C6 C5 1.366(6)	C35 H35 0.9300	N1 H1A 0.8600
C6 H6 0.9300	C23 C24 1.364(5)	N4 H4A 0.8600
C5 H5 0.9300	C23 C22 1.372(5)	
C15 N2 1.322	C23 H23 0.9300	

Table S2 Angles [deg] for ligand (**L**)

C10 C9 C14 118.4(4)	N1 C15 C16 122.8(4)	C23 C22 C27 119.7(4)
C10 C9 C8 121.3(4)	C20 N5 C16 116.7(4)	C23 C22 H22 120.2
C14 C9 C8 120.3(4)	N5 C16 C17 123.6(4)	C27 C22 H22 120.2
C7 C8 N1 104.9(4)	N5 C16 C15 116.3(4)	C33 C34 C35 120.4(4)
C7 C8 C9 134.4(4)	C17 C16 C15 120.0(4)	C33 C34 H34 119.8
N1 C8 C9 120.6(4)	C19 C18 C17 118.8(5)	C35 C34 H34 119.8
C8 C7 N2 110.2(3)	C19 C18 H18 120.6	C24 C25 C26 120.9(4)
C8 C7 C2 130.9(4)	C17 C18 H18 120.6	C24 C25 H25 119.5
N2 C7 C2 118.8(4)	C16 C17 C18 117.9(4)	C26 C25 H25 119.5
C1 C2 C3 118.6(4)	C16 C17 H17 121.0	C34 C33 C32 119.9(4)
C1 C2 C7 119.6(4)	C18 C17 H17 121.0	C34 C33 H33 120.0
C3 C2 C7 121.8(4)	C20 C19 C18 119.6(5)	C32 C33 H33 120.0
C12 C11 C10 120.1(5)	C20 C19 H19 120.2	C33 C32 C31 120.1(4)
C12 C11 H11 119.9	C18 C19 H19 120.2	C33 C32 H32 120.0
C10 C11 H11 119.9	N5 C20 C19 123.3(5)	C31 C32 H32 120.0
C2 C1 C6 121.1(5)	N5 C20 H20 118.4	N3 C36 N4 111.9(3)
C2 C1 H1 119.5	C19 C20 H20 118.4	N3 C36 C37 124.1(4)
C6 C1 H1 119.5	C27 C26 C25 118.4(4)	N4 C36 C37 123.7(4)
C4 C3 C2 120.7(5)	C27 C26 C28 119.2(4)	N6 C37 C38 123.1(4)
C4 C3 H3 119.7	C25 C26 C28 122.4(4)	N6 C37 C36 116.0(4)
C2 C3 H3 119.7	C28 C29 N4 105.6(3)	C38 C37 C36 120.8(4)
C11 C10 C9 120.8(4)	C28 C29 C30 133.7(4)	C37 N6 C41 116.5(4)
C11 C10 H10 119.6	N4 C29 C30 120.5(4)	C37 C38 C39 118.1(4)
C9 C10 H10 119.6	C35 C30 C31 118.1(4)	C37 C38 H38 120.9
C13 C14 C9 120.1(5)	C35 C30 C29 120.8(4)	C39 C38 H38 120.9
C13 C14 H14 119.9	C31 C30 C29 121.1(4)	C40 C39 C38 119.4(4)
C9 C14 H14 119.9	C29 C28 N3 109.8(3)	C40 C39 H39 120.3
C13 C12 C11 119.5(5)	C29 C28 C26 132.2(4)	C38 C39 H39 120.3
C13 C12 H12 120.2	N3 C28 C26 117.9(4)	C39 C40 C41 119.1(5)
C11 C12 H12 120.2	C26 C27 C22 120.8(4)	C39 C40 H40 120.5

C14 C13 C12 120.9(5)	C26 C27 H27 119.6	C41 C40 H40 120.5
C14 C13 H13 119.5	C22 C27 H27 119.6	N6 C41 C40 123.8(5)
C12 C13 H13 119.5	C34 C35 C30 120.5(4)	N6 C41 H41 118.1
C5 C4 C3 119.5(5)	C34 C35 H35 119.7	C40 C41 H41 118.1
C5 C4 H4 120.2	C30 C35 H35 119.7	C15 N1 C8 108.1(3)
C3 C4 H4 120.2	C24 C23 C22 120.7(4)	C15 N1 H1A 126.0
C5 C6 C1 119.4(5)	C24 C23 H23 119.6	C8 N1 H1A 126.0
C5 C6 H6 120.3	C22 C23 H23 119.6	C36 N4 C29 107.4(3)
C1 C6 H6 120.3	C32 C31 C30 120.9(4)	C36 N4 H4A 126.3
C6 C5 C4 120.7(5)	C32 C31 H31 119.5	C29 N4 H4A 126.3
C6 C5 H5 119.6	C30 C31 H31 119.5	C15 N2 C7 105.2(3)
C4 C5 H5 119.6	C23 C24 C25 119.5(4)	C36 N3 C28 105.2(3)
N2 C15 N1 111.6(4)	C23 C24 H24 120.2	
N2 C15 C16 125.4(4)	C25 C24 H24 120.2	

Table S3 Hydrogen bonding interactions of ligand (**L**)

Hydrogen bonds with	d(H...A) < R(H) + R(A) - 0.12 Ang., D-H...A > 100.0 Deg.			
Donor --- H....Acceptor	D-H	H...A	D...A	D-H...A
N(1)---H(1A)...N(2)	0.86	2.16	2.9721	156
N(4)---H(4A)...N(3)	0.86	2.11	2.9216	158
C(21)---H(21)...N(1)	0.93	2.48	2.8135	101
C(27)---H(27)...N(3)	0.93	2.54	2.8504	100
C(42)---H(42)...N(4)	0.93	2.50	2.8307	101

Table S4 Determination of Cu^{2+} in real water samples

Sample	Added (μM)	Mean found (μM)	RSD (%)	Recovery (%)
1	0	Not detectable		
	5	5.56	1.19	99.2
2	0	11.61		
	5	16.69	0.99	100.5

Sample 1: tap water; sample 2: river water; RSD (%): relative standard deviation of three determinations.