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# Thermosensitive fluorescent Eu-based metal-organic framework and its polyether sulfone composite film as a thermal sensor

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**Table S1.** The structural determination and refinement data for **1**.

| | |
|---|---|
| Empirical formula | $C_{12}H_8ClEuO_5$ |
| Color and Habit | Yellow platelet |
| Crystal Size ($mm^3$) | 0.20×0.20×0.05 |
| Crystal system | monoclinic |
| Space group | $P2_1/c$ |
| $a$ (Å) | 13.1597(9) |
| $b$ (Å) | 12.8654(9) |
| $c$ (Å) | 7.1664(5) |
| $B$ (°) | 100.323(2) |
| $V$ ($Å^3$) | 1193.67(14) |
| $Z$ | 4 |
| $Fw$ | 419.59 |
| $D_{calcd}$ ($Mgm^{-3}$) | 2.335 |
| $\mu$ ($mm^{-1}$) | 5.490 |
| $F$ (000) | 800.0 |
| $2\theta$ (°) | 6.842 to 50.026 |
| Reflections measured | 27535 |
| Independent reflections | 2080 [$R_{int}$ = 0.0386, $R_{sigma}$ = 0.0165] |
| Final $R_1$, $wR_2$ indices (obs.) | $R_1$ = 0.0217, $wR_2$ = 0.0504 |
| $R_1$, $wR_2$ indices (all) | $R_1$ = 0.0223, $wR_2$ = 0.0509 |
| $S$ | 1.052 |
| $(\Delta\rho)_{max/min}$ ($eÅ^{-3}$) | 1.36/-0.73 |

$R_1 = (\Sigma||F_o| - |F_c|| / \Sigma |F_o|)$. $wR_2 = [\Sigma (w(F_o^2 - F_c^2)^2) / \Sigma (w |F_o^2|^2)]^{1/2}$

**Table S2.** Selected bond distances (Å) and bond angles (º) of **1**.

| | |
|---|---|
| Eu1-O11=2.267(3) | Eu1-O1W=2.405(3) |
| Eu1-O22$^{1}$=2.295(3) | Eu1-Cl1$^{4}$=2.7848(9) |
| Eu1-O12$^{2}$=2.345(3) | Eu1-Cl1=2.8301(9) |
| Eu1-O21$^{3}$=2.352(3) | |
| O11-Eu1-O22$^{1}$=119.74(10) | O11-Eu1-Cl1$^{4}$=161.42(8) |
| O11-Eu1-O12$^{2}$=101.29(10) | O22$^{1}$-Eu1-Cl1$^{4}$=76.55(7) |
| O22$^{1}$-Eu1-O12$^{2}$=116.06(10) | O12$^{2}$-Eu1-Cl1$^{4}$=76.70(7) |
| O11-Eu1-O21$^{3}$=83.30(10) | O21$^{3}$-Eu1-Cl1$^{4}$=92.59(7) |
| O22$^{1}$-Eu1-O21$^{3}$=77.16(10) | O1W-Eu1-Cl1$^{4}$=121.95(7) |
| O12$^{2}$-Eu1-O21$^{3}$=159.63(9) | O11-Eu1-Cl1=79.19(8) |
| O11-Eu1-O1W=74.76(10) | O22$^{1}$-Eu1-Cl1=152.44(7) |
| O22$^{1}$-Eu1-O1W=69.71(10) | O12$^{2}$-Eu1-Cl1=75.30(7) |
| O12$^{2}$-Eu1-O1W=77.70(10) | O21$^{3}$-Eu1-Cl1=86.25(7) |
| O21$^{3}$-Eu1-O1W=122.49(10) | O1W-Eu1-Cl1=137.60(7) |
| | Cl1$^{4}$-Eu1-Cl1=82.463(18) |

Symmetry codes: [1] 1-*x*, 1-*y*, -*z*; [2] 2-*x*, 1-*y*, -*z*; [3] 1-*x*, 1/2+*y*, -1/2-*z*; [4] *x*, 3/2-*y*, 1/2+*z*.

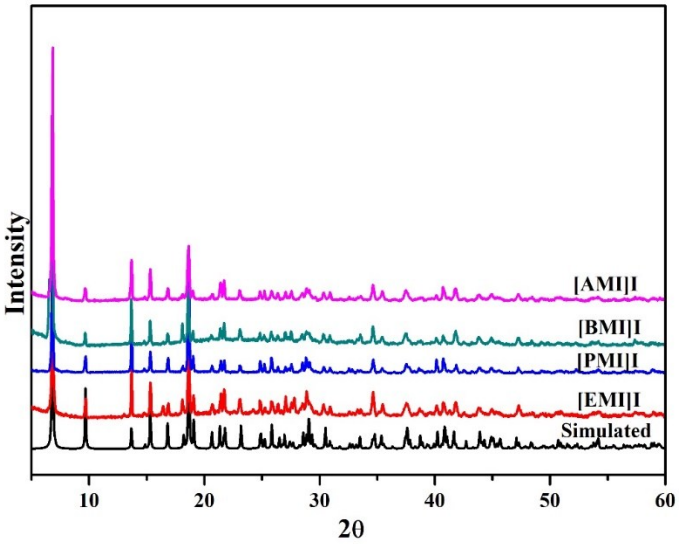


**Figure S1**. Simulated and experimental PXRD patterns of **1** synthesized in four kinds of 1-methyl-3-alkylimidazolium iodine ionic liquids.

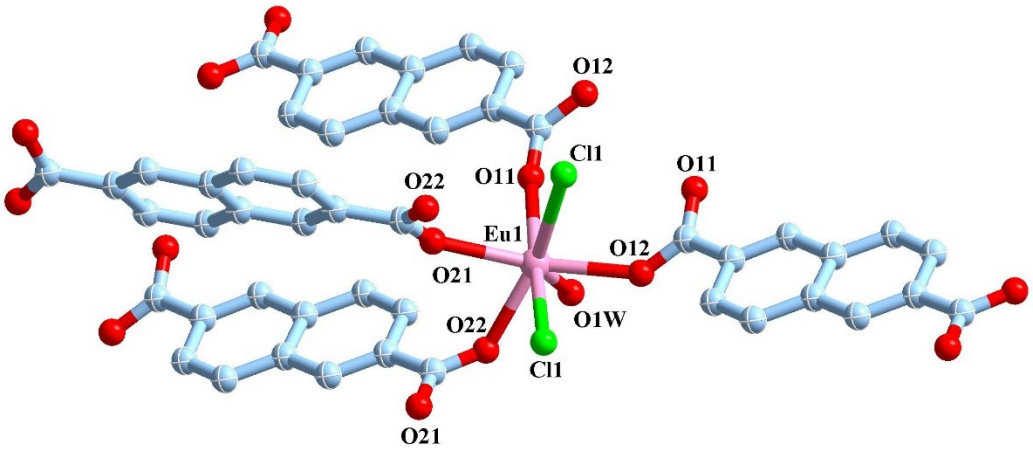


**Figure S2**. The coordination geometry of Eu1.

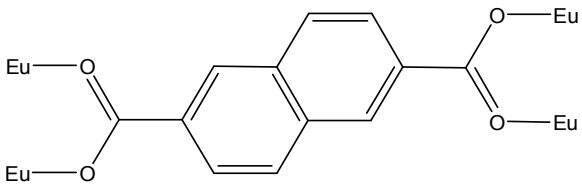


**Figure S3**. The coordination fashion of $NDC^{2-}$ ligand

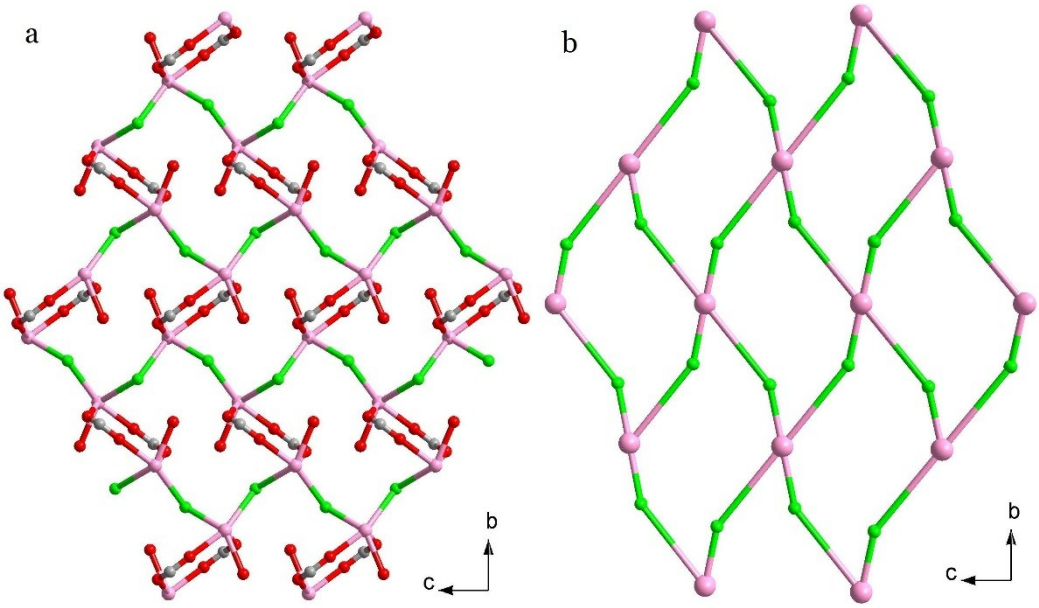


**Figure S4**. Structure of 2D layer of **1**. The 2D layer was constructed by each $[Eu_2(COO)_2(H_2O)_2]$ subunit surrounded by four $\mu_2$-$Cl^-$ along the *bc*-plane (a), which was simplified into a (4,4) topological network (b).

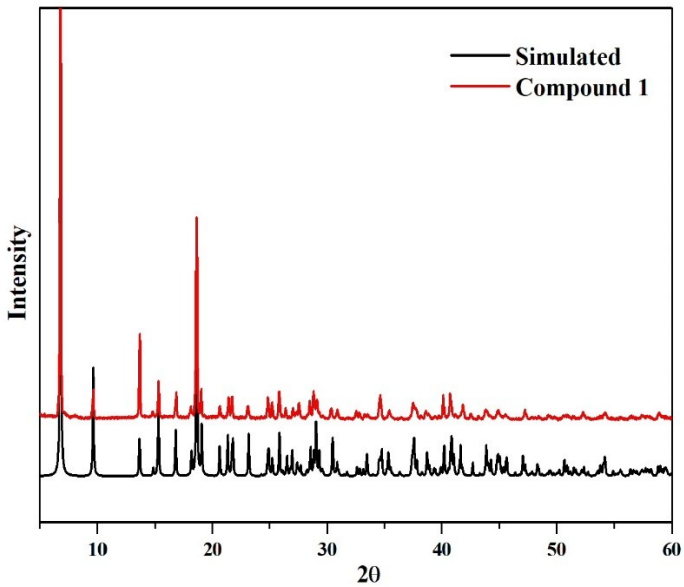


**Figure S5**. Simulated and experimental PXRD patterns of **1**.

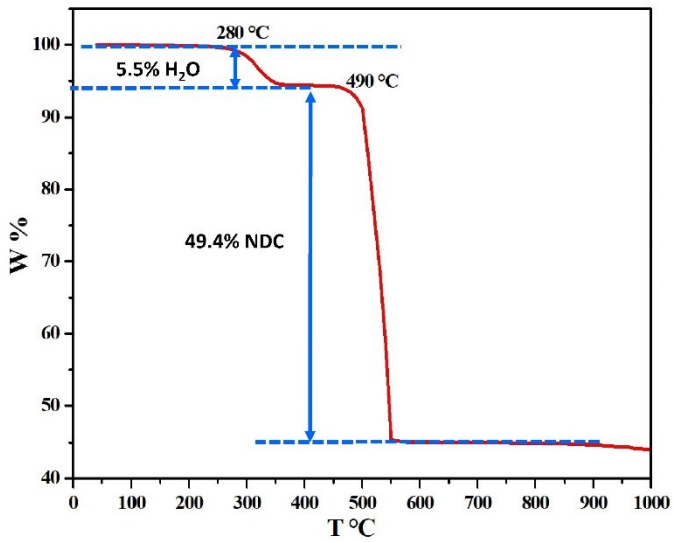


**Figure S6**. TG curve of **1** in $N_2$ atmosphere.

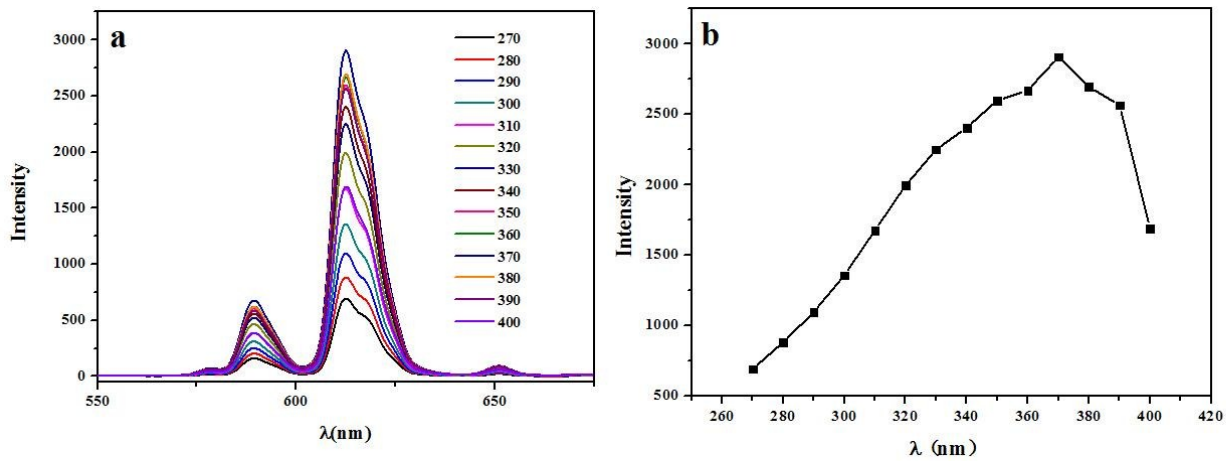


**Figure S7**. Fluorescence intensities of **1** excited by UV lights at 270-400 nm with a step of 10 nm. Fluorescence spectra of **1** obtained with different excitation wavelengths (a) and the varied intensities at 613 nm with different excitation wavelengths (b).

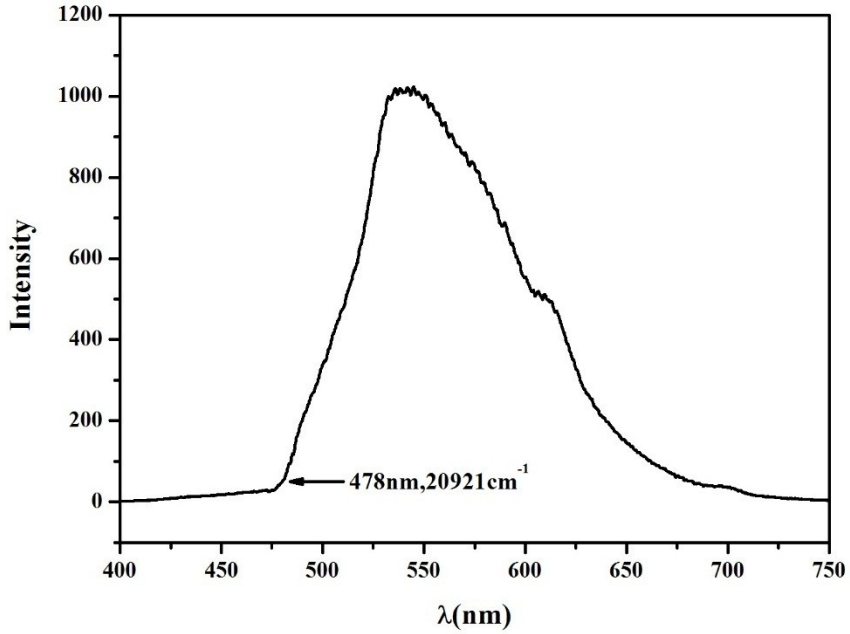


**Figure S8**. The low-temperature phosphorescence spectrum of Gd-NDC under 340 nm excitation at 77 K.

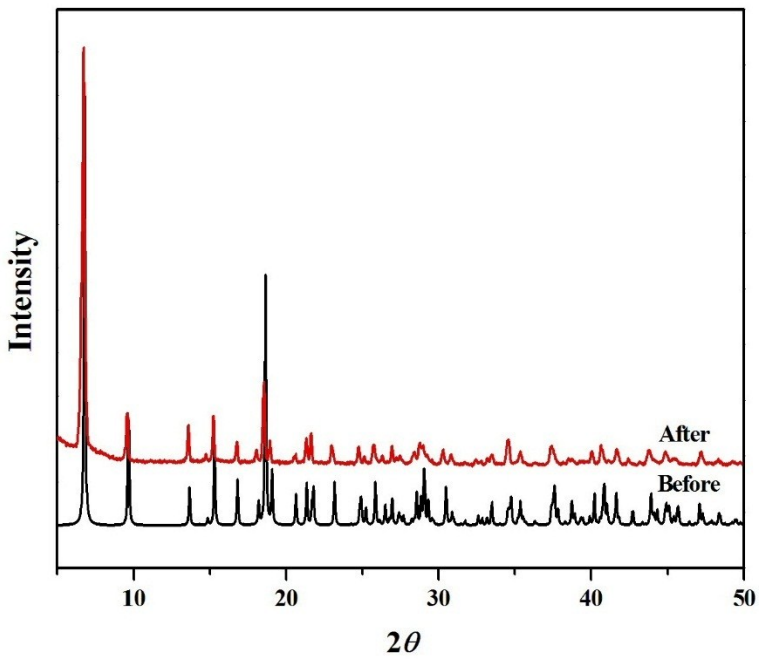


**Figure S9**. The PXRD comparison of **1** before and after ten quenching-recovery cycles.

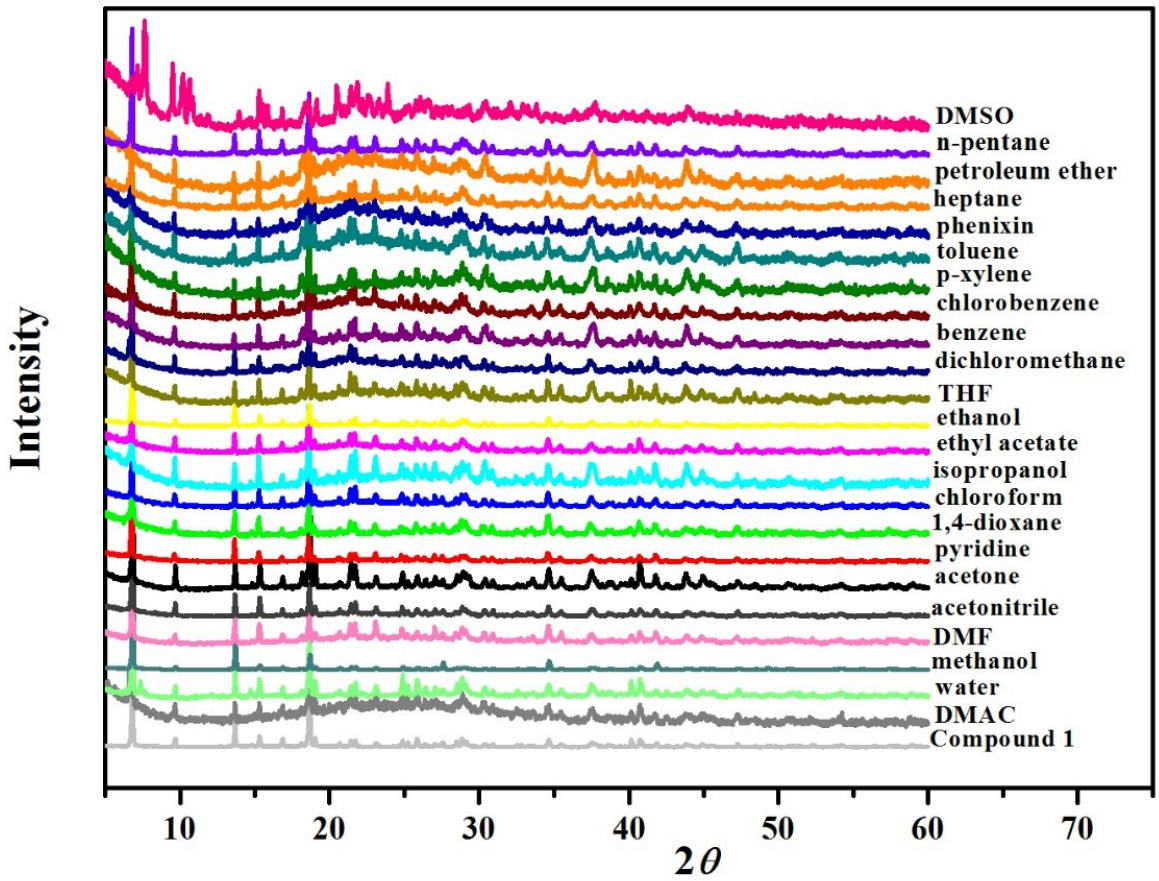


**Figure S10**. PXRD patterns of **1** immersed in water and 22 organic solvents for 5 h.

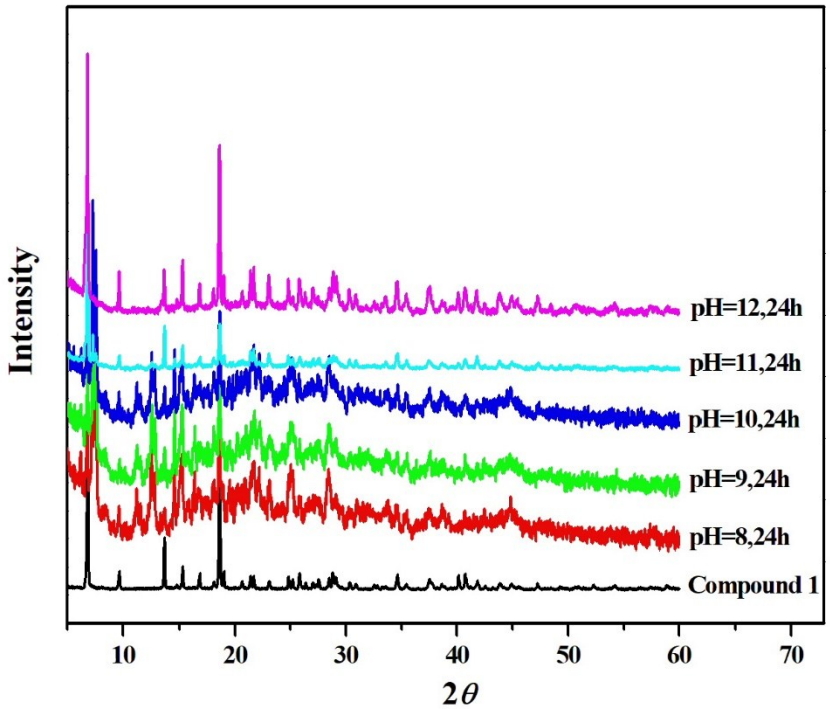


**Figure S11.** PXRD patterns of **1** immersed in NaOH solutions of pH = 8-12 for 24h.

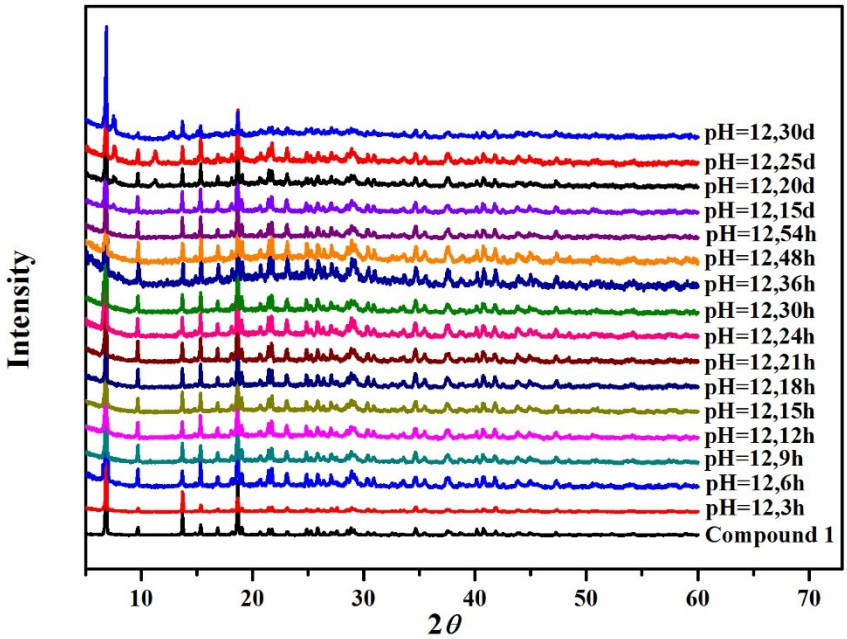


**Figure S12**. PXRD patterns of **1** immersed in NaOH solutions of pH = 12 for 3h-30d.

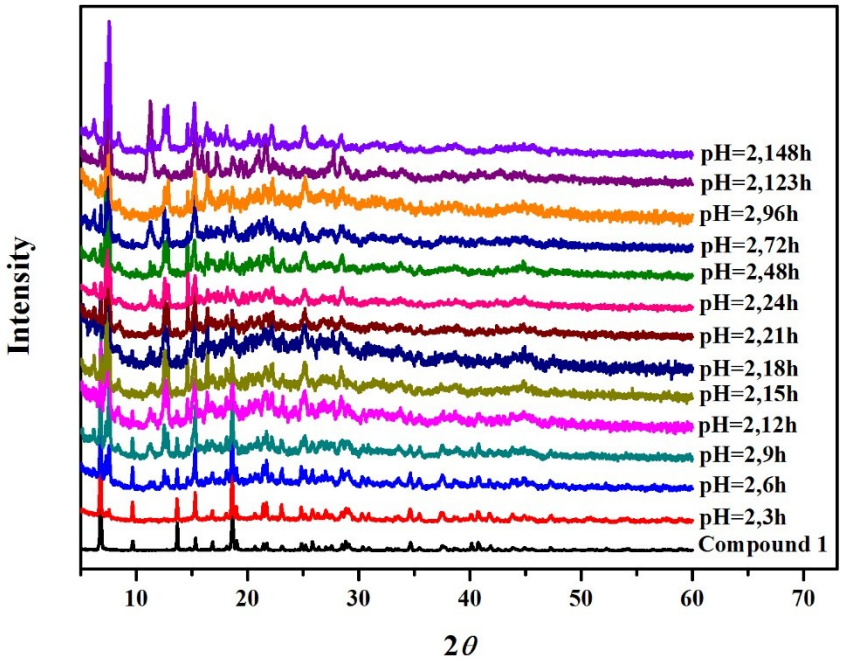


**Figure S13**. PXRD patterns of **1** immersed in HCl solutions of pH = 2 for 3-148 h.

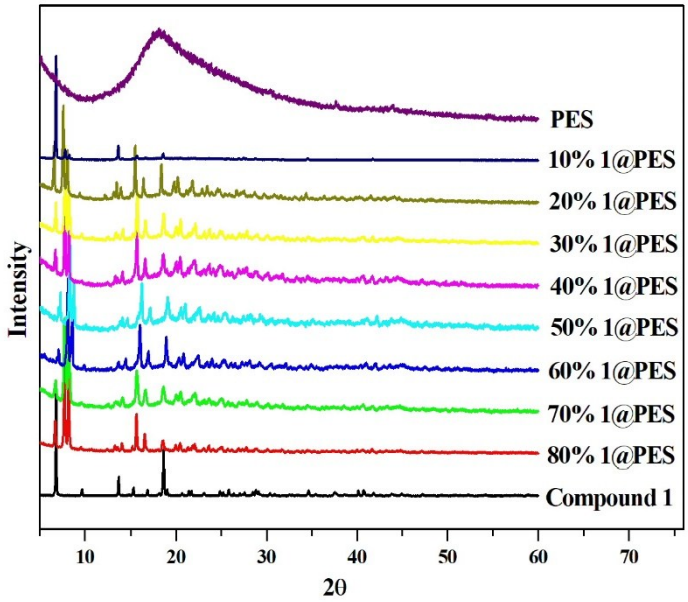


**Figure S14**. PXRD patterns of **1**, PES and **1**@PES composite films with different loadings of **1**.

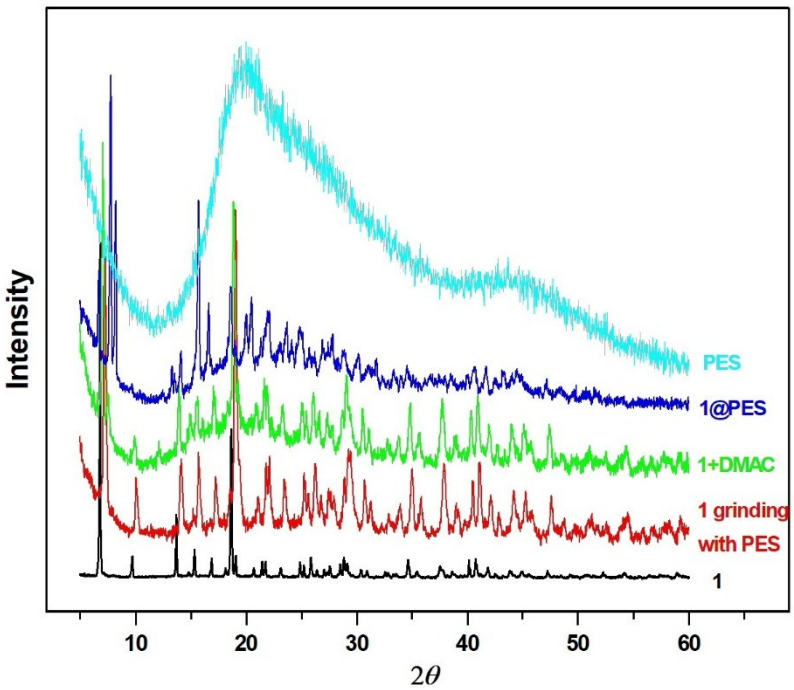


**Figure S15**. PXRD patterns of **1**, **1** grinding with PES, PES and 40% **1**@PES films.

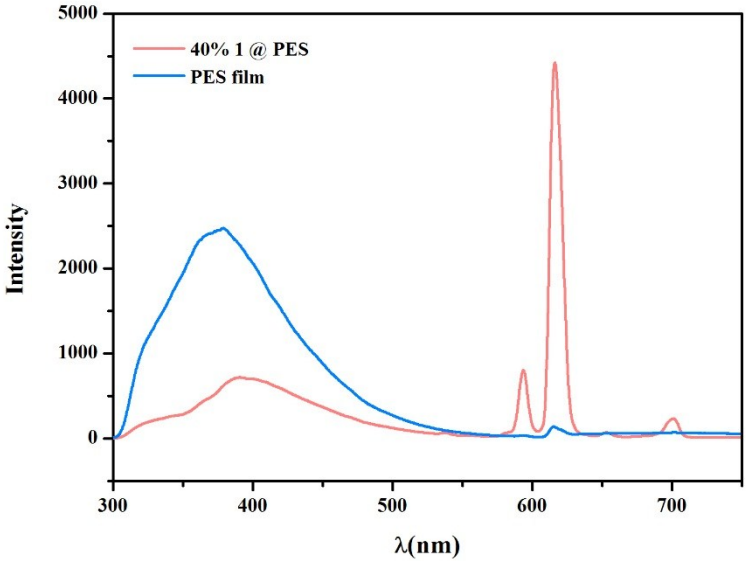


**Figure S16**. Fluorescence spectra of pure PES film and 40% **1**@PES films.