Supporting Information for

Manual Assembly of Rare-earth Polyoxometalate Micro-crystals Film Showing Polarized Luminescence

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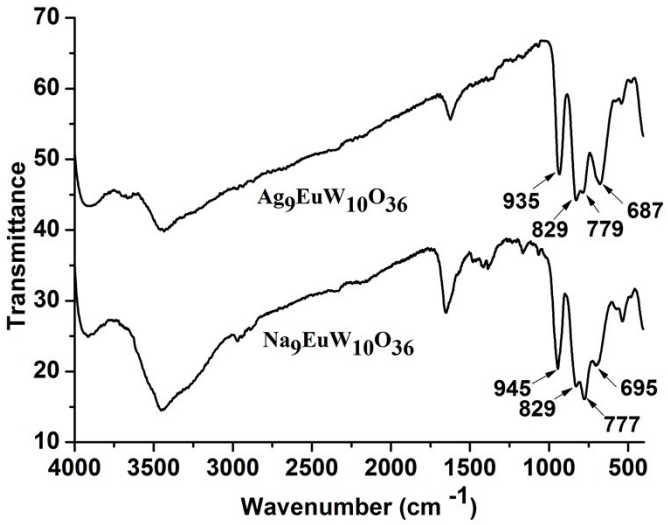


Figure S1. IR spectra of $Ag_9[EuW_{10}O_{36}]$ microplates and $Na_9[EuW_{10}O_{36}]$ powders.

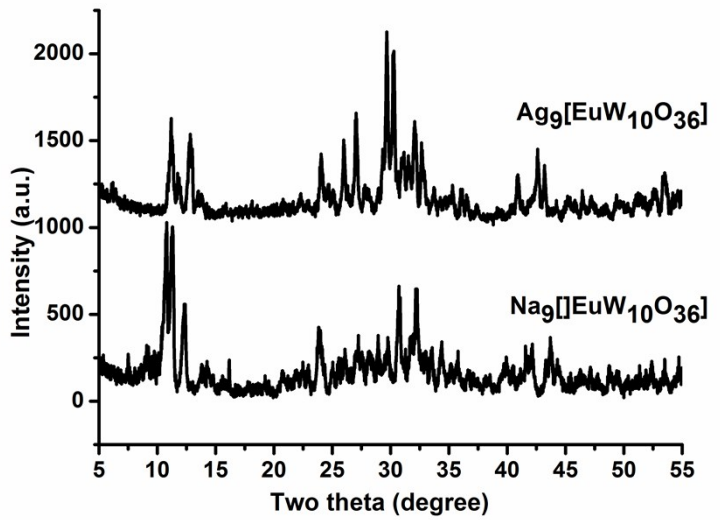
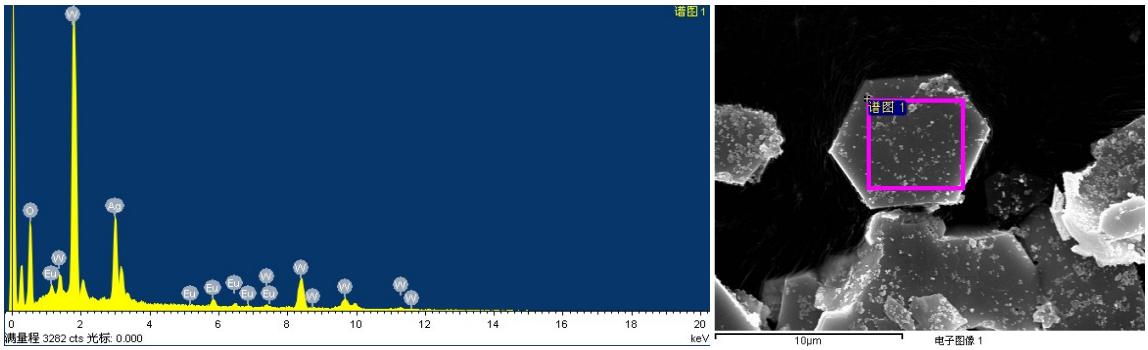


Figure S2. The XRD patterns of $Na_9[EuW_{10}O_{36}]$ and $Ag_9[EuW_{10}O_{36}]$ powders.



(a) (b)

Figure S3. EDX analysis of the $Ag_9[EuW_{10}O_{36}]$ microplates (a) and the SEM image highlighting the area for EDX analysis (b).

Table S1. ICP analysis results of the atomic ratio of elements

element	weight percentage(%)	Atomic ratio
O	25.69	76.65
Ag	21.14	9.36
Eu	3.38	1.06
W	49.79	12.93

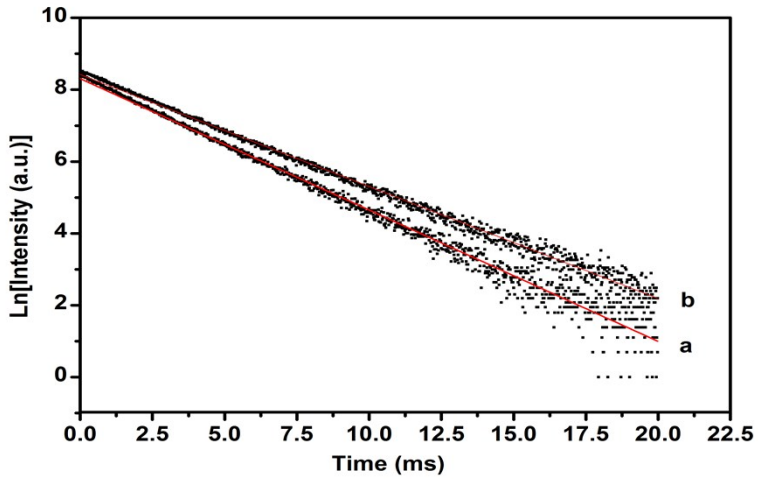


Figure S4. Emission decay curves of $^5D_0 \rightarrow {}^7F_1$ emitting state under 270 nm excitation of the $Ag_9[EuW_{10}O_{36}]$ micro-crystals (a) and the manually assembled film (b).

Table S2. Summary of luminescence data of $Ag_9[EuW_{10}O_{36}]$ micro-crystals and the film prepared by manual method

Sample	k_r(ms^{-1})	k_{nr}(ms^{-1})	k_{tot}(ms^{-1})	τ(ms)	η*
$Ag_9[EuW_{10}O_{36}]$ micro-crystals	0.1930	0.1296	0.3226	3.10	59.83%
Film prepared by manual method	0.1810	0.1506	0.3436	2.91	52.67%

*the value of η is calculated by incorporating fluorescence lifetimes into the formula (1), (2) and (3),

$$k_r = k_{r(0\rightarrow1)}\frac{\sum_{j=0}^{4} S_{(0\rightarrow j)}}{S_{(0\rightarrow1)}} \quad (1)$$

where $k_r(0\rightarrow1) = 1.35\times10^{-2}$ s^{-1} stands for radioactive transition, S stands for integral area of characteristic Eu(III) ion emission.

$$k_{tot} = \frac{1}{\tau} = k_r + k_{nr} \quad (2)$$

where τ stands for fluorescence life time k_{nr} stands for nonradioactive transition.

$$\eta = \frac{k_r}{k_r + k_{nr}} \quad (3)$$