

## Supporting Information

### Red Luminescent $\text{Eu}^{2+}$ in $\text{K}_2\text{MgH}_4$ and Comparison with $\text{KMgH}_3$

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**Rietveld refinement of XRD**

The Rietveld analysis for the obtained XRD patterns were performed by FullProf. Cell parameters, thermal factors  $B_{iso}$  of K and Mg, shape parameters and asymmetry were refined. Table S1 shows the refined lattice parameters and atomic parameters for  $K_2MgH_4$ .

Table S1. Refined lattice parameters and atomic parameters for  $K_2MgH_4$ .

$K_2MgH_4$		$a=b=4.0457(2) \text{ \AA}$ and $c= 13.6204(8) \text{ \AA}$ , $R_{wp}=10.2\%$ , $R_{Bragg}=5.94\%$				
Atom	site	x	y	z	$B_{iso} (\text{\AA}^2)$	s.o.f
K	4e	0.00000	0.00000	0.35500	0.601(161)	1
Mg	2a	0.00000	0.00000	0.00000	0.005(192)	1
H1	4e	0.00000	0.00000	0.14500	1.000(0)	1
H2	4c	0.50000	0.00000	0.00000	1.000(0)	1

**Temperature dependence of PL spectra**

Figure S1 shows the normalized PL spectra at different temperatures from 100 K to 350K. The centroid wavelength of the PL band is almost unchanged with temperature. The PL bandwidth slightly broadens with increasing temperature.

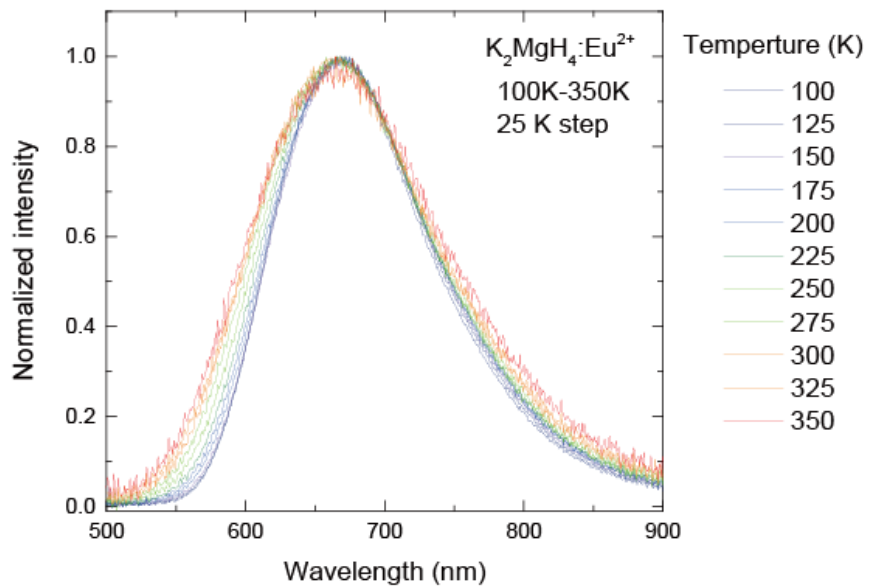


Figure S1. Normalized PL spectra at different temperatures from 100 K to 350 K.