Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

Dimeric complexes of rare-earth substituted Keggin-type silicotungstates: Syntheses, crystal structure and solid state properties

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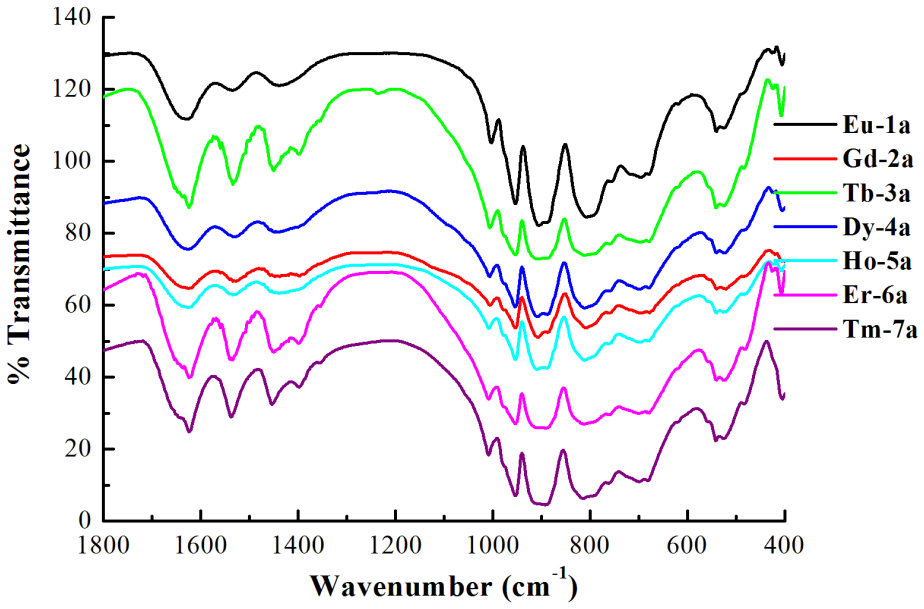

Fig. S1 FT-IR spectra of **$Na_4K_8[\{Ln(\alpha\text{-}SiW_{11}O_{39})(H_2O)\}_2(\mu\text{-}CH_3COO)_2]\cdot xH_2O$** [Ln = Eu^{III} (**Eu-1a**), Gd^{III} (**Gd-2a**), Tb^{III} (**Tb-3a**), Dy^{III} (**Dy-4a**), Ho^{III} (**Ho-5a**), Er^{III} (**Er-6a**), and Tm^{III} (**Tm-7a**)] (recorded on KBr pellets).

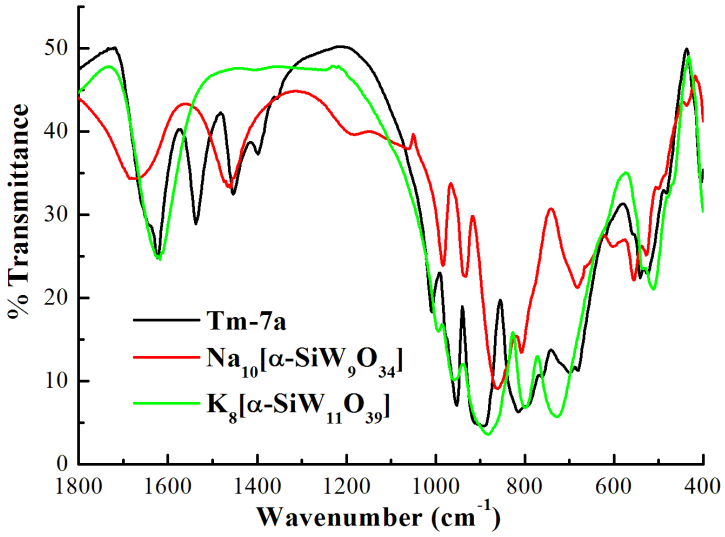

Fig. S2 FT-IR spectra of **Tm-7a** POM, $Na_{10}[\alpha\text{-}SiW_9O_{34}]\cdot 16H_2O$ and $K_8[\alpha\text{-}SiW_{11}O_{39}]\cdot 13H_2O$ (recorded on KBr pellets)

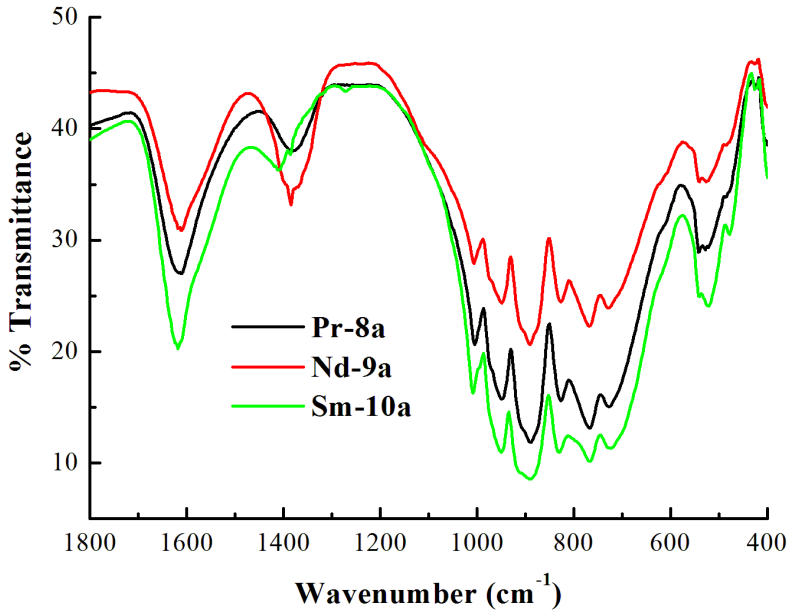

Fig. S3 FT-IR spectra of $\mathbf{K_6Na_7[Ln(SiW_{11}O_{39})_2]\cdot xH_2O}$ [Ln = Pr^{III} (**Pr-8a**), Nd^{III} (**Nd-9a**), and Sm^{III} (**Sm-10a**)] POMs (recorded on KBr pellets).

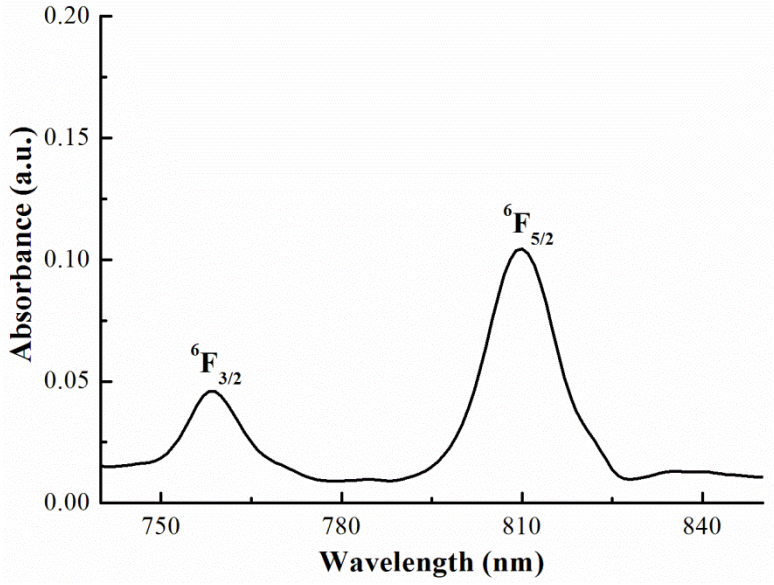

Fig. S4 Solid state UV/vis spectrum of $\mathbf{Na_4K_8[\{Dy(\alpha\text{-}SiW_{11}O_{39})(H_2O)\}_2(\mu\text{-}CH_3COO)_2]\cdot 30H_2O}$ **(Dy-4a)**.

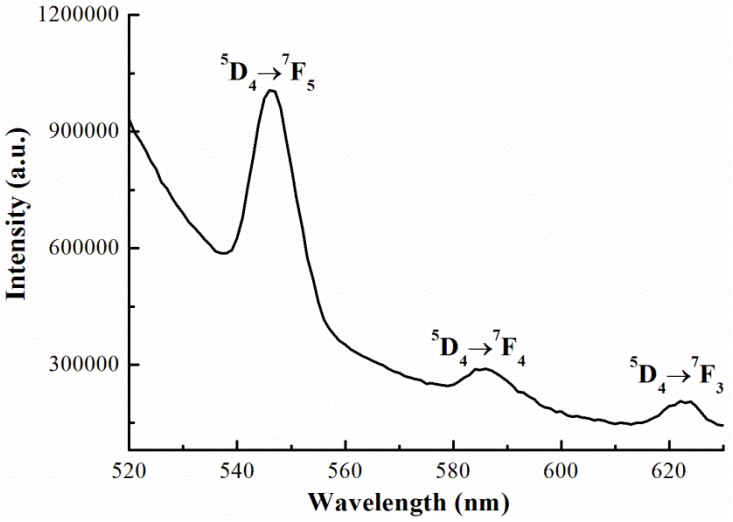

Fig. S5 Photoluminescence spectrum of **$Na_4K_8[\{Tb(\alpha\text{-}SiW_{11}O_{39})(H_2O)\}_2(\mu\text{-}CH_3COO)_2]\cdot 22H_2O$ (Tb-3a)**.

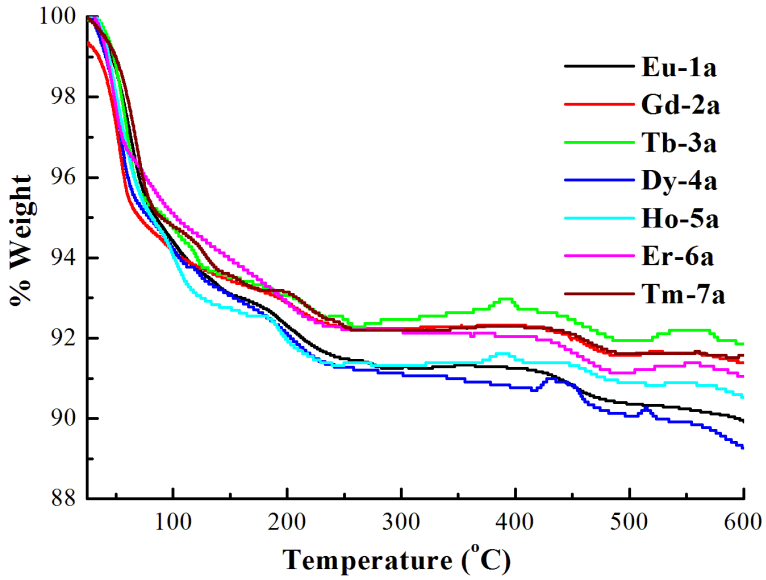

Fig. S6 Thermogravimetric analysis data of **$Na_4K_8[\{Ln(\alpha\text{-}SiW_{11}O_{39})(H_2O)\}_2(\mu\text{-}CH_3COO)_2]\cdot xH_2O$** [Ln = Eu^{III} (**Eu-1a**), Gd^{III} (**Gd-2a**), Tb^{III} (**Tb-3a**), Dy^{III} (**Dy-4a**), Ho^{III} (**Ho-5a**), Er^{III} (**Er-6a**), and Tm^{III} (**Tm-7a**)].

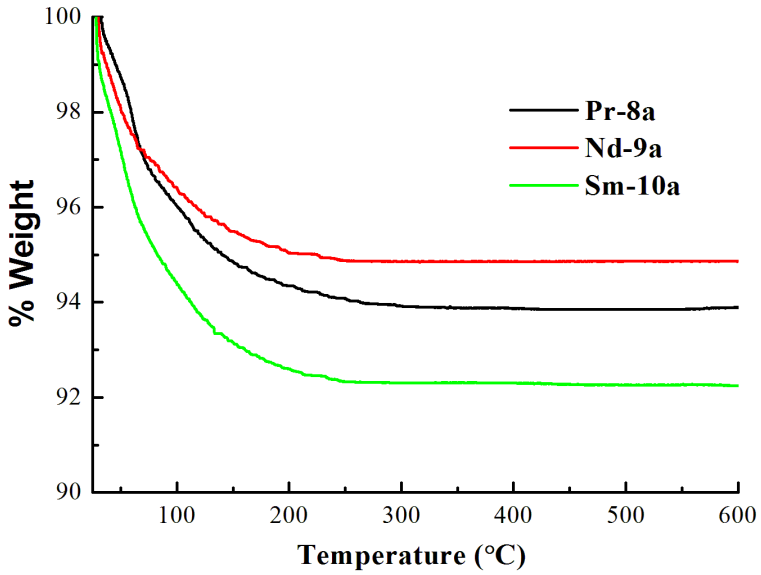

Fig. S7 Thermogravimetric analysis data of $\mathbf{K_6Na_7[Ln(SiW_{11}O_{39})_2]\cdot xH_2O}$ [Ln = Pr^{III} (**Pr-8a**), Nd^{III} (**Nd-9a**), and Sm^{III} (**Sm-10a**)].

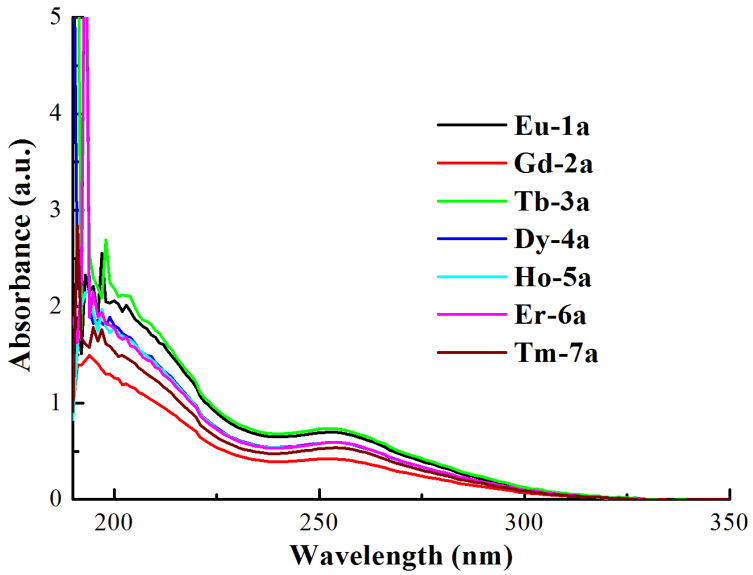

Fig. S8 UV/vis spectra of $\mathbf{Na_4K_8[\{Ln(\alpha\text{-}SiW_{11}O_{39})(H_2O)\}_2(\mu\text{-}CH_3COO)_2]\cdot xH_2O}$ [Ln = Eu^{III} (**Eu-1a**), Gd^{III} (**Gd-2a**), Tb^{III} (**Tb-3a**), Dy^{III} (**Dy-4a**), Ho^{III} (**Ho-5a**), Er^{III} (**Er-6a**), and Tm^{III} (**Tm-7a**)]

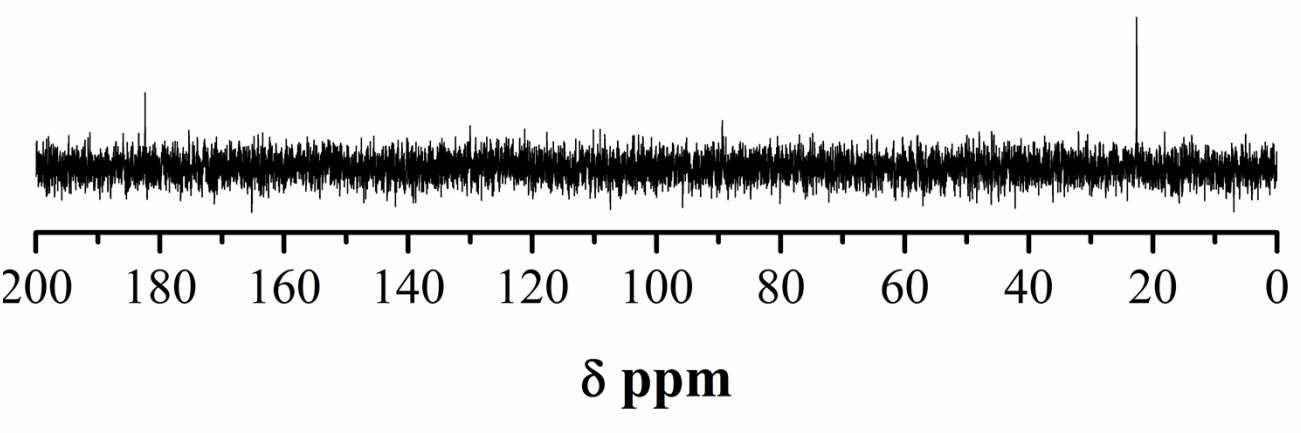

Fig. S9 ^{13}C NMR data of **Eu-1a**, POMs

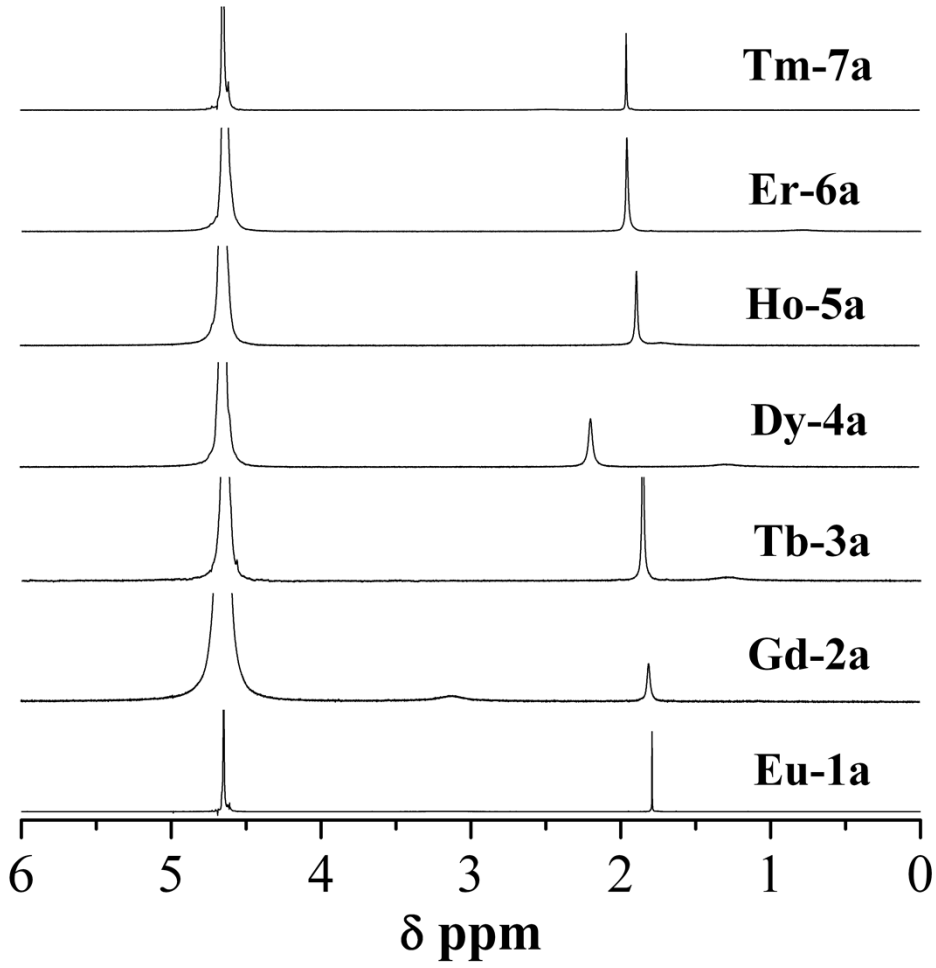

Fig. S10 ^{1}H NMR data of **Eu-1a**, **Gd-2a**, **Tb-3a**, **Dy-4a**, **Eu-5a, Er-6a** and **Tm-7a** POM