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Supporting Information

Figure S1. FAB mass spectrum of 2-(4-(2,2′:6′,2″)-terpyridin-4′-yl-benzyloxy)benzaldehyde (L1).
Figure S2. 500 MHz $^1$H (a) and 125 MHz $^{13}$C (b) NMR spectrum of 2-(4-(2,2':6',2'″)-terpyridin-4'‑yl-benzyloxy)benzaldehyde (L$^1$) in CDCl$_3$. 
Figure S3. ESI mass spectrum of L².
Figure S4. 500 MHz $^1$H (a) and 125 MHz $^{13}$C (b) NMR spectrum of L$^2$ in CDCl$_3$. 
Figure S5. MALDI-TOF mass spectrum of \([\text{Tb(NO}_3\text{)}_2(\text{L}^2)](\text{NO}_3)_5\)·5H\(_2\)O (2).
**Figure S6.** ESI mass spectrum of $[\text{Zn(ttpy)Cl}_2]$ (3).

**Figure S7.** ESI mass spectrum of $[\text{Ru(ttpy)(L)}_2(\text{PF}_6)_2]$ (4).
Figure S8. ESI mass spectrum of [{Ru(ttpy)}₂(L²)](PF₆)₄ (5).
Figure S9. The ESI mass spectrum of [Tb(NO$_3$)$_2$(L$^2$)$_2$]$_2$[Ru(tpy)$_2$](PF$_6$)$_5$ (6).
Figure S10. Electronic absorption spectrum of \( L^2 \) in acetonitrile at 25 °C.
Figure S11. Emission spectrum of L² (λ_ex = 267 nm) in acetonitrile at 25 °C.
Figure S12. Electronic absorption spectrum of 2 in acetonitrile at 25 °C.
Figure S13. Excitation spectrum of 2 (a) ($\lambda_{em} = 545$ nm), 5 (b) ($\lambda_{em} = 698$ nm), 6 (c) ($\lambda_{em} = 687$ nm) and 7 (d) ($\lambda_{em} = 543$ nm) in acetonitrile at 25 °C.
Figure S14. Electronic absorption spectrum of [Tb(NO₃)₂(L²)₂(Zn(ttpy))₂(NO₃)Cl⁴(7) in acetonitrile.
Figure S15. Emission spectrum of [Tb(NO₃)₂(L²)₂{(Zn(ttpy)}₂](NO₃)Cl₄ (7) (λₑₓ = 288 nm) in acetonitrile at 25 °C.
Figure S16. The cyclic voltammogram of [{Ru(tpy)}_2(L^2)](PF_6)_4 (5) on a glassy carbon millielectrode in acetonitrile (0.1 M tetraethylammonium perchlorate) in the potential range 0 to 2 V versus Ag/AgCl at 25 °C, scan rate = 50 mV s^{-1}.
Figure S17. The cyclic voltammogram of $\left[\{\text{Ru(tpy)}\}_2(L^2)\right](\text{PF}_6)_4$ (5) on a glassy carbon millielectrode in acetonitrile (0.1 M tetraethylammonium perchlorate) in the potential range 0 to –2 V versus Ag/AgCl at 25 °C, scan rate = 50 mV s$^{-1}$. 
Figure S18. The cyclic voltammogram of [Tb(NO$_3$)$_2$(L$^2$){Ru(tpy)}$_2$](PF$_6$)$_5$ (6) in the potential range 0 to 1.2 V versus Ag/Ag$^+$ on a glassy carbon millielectrode in acetonitrile (0.1 M tetraethylammonium perchlorate) at 25 °C, scan rate = 50 mV s$^{-1}$. 

![Cyclic voltammogram of [Tb(NO$_3$)$_2$(L$^2$){Ru(tpy)}$_2$](PF$_6$)$_5$ (6).]
Figure S19. The cyclic voltammogram of $[\text{Tb(NO}_3)_2(\text{L}^2)\{\text{Ru(tppy)}\}_2](\text{PF}_6)_5$ (6) in the potential range 0 to -2 V versus Ag/Ag$^+$ on a glassy carbon millielectrode in acetonitrile (0.1 M tetraethylammonium perchlorate) at 25 °C, scan rate = 50 mV s$^{-1}$. 
Figure S20. The cyclic voltammogram of \([\text{Tb(NO}_3\text{)}_2(\text{L}^2)(\text{Zn(tppy)})_2](\text{NO}_3)\text{Cl}_4\) (7) in the potential range -1 to -2 V versus Ag/Ag\(^+\) on a glassy carbon millielectrode in acetonitrile (0.1 M tetraethylammonium perchlorate) at 25 °C, scan rate = 50 mV \(s^{-1}\).