

Figure S1. a: The whole experimental setup for  $\text{MFE}_{\text{ECL}}$  and MC measurements; b: The enlarged experimental setup for the electrochemical cell part.

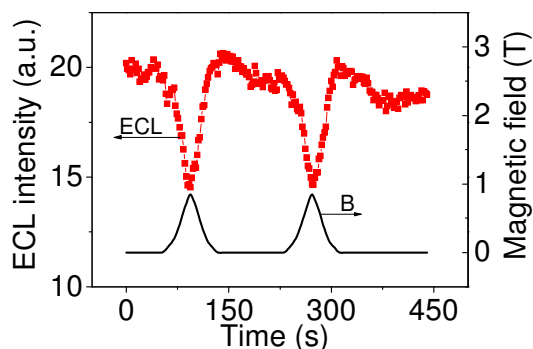


Figure S2. The original data of  $\text{MFE}_{\text{ECL}}$  for  $\text{Ru}(\text{bpy})_3^{2+}/\text{C}_2\text{O}_4^{2-}$  system. With the application of magnetic field (black line), the ECL intensity (red line) will decrease. When the applied magnetic field ceases, the ECL intensity will revert to the amplitude before applying a magnetic field. The measurements are repeated at least twice.

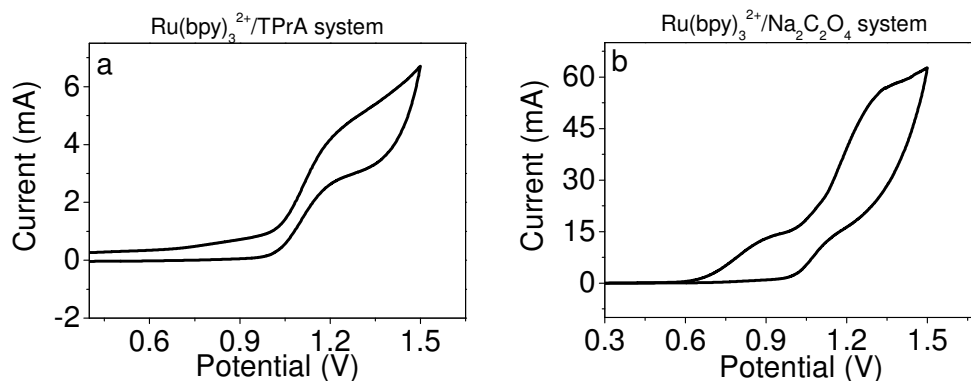


Figure S3. The cyclic voltammograms of 1mM  $\text{Ru}(\text{bpy})_3\text{Cl}_2$ + 0.1M  $\text{TPrA}/\text{Na}_2\text{C}_2\text{O}_4$ + 0.1 M  $\text{NaH}_2\text{PO}_4$  in water at a platinum electrode (scan rate 50 mV/s).