

Supporting Information

Multi-Potential-Step Chronocoulopectrometry for Electrocatalytic Water Oxidation by a Mononuclear Ruthenium Aqua Complex Immobilized on a Mesoporous ITO Electrode

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Calculation of TOF

The averaged TOF value during 100 s was calculated from the MPSCCS measurements at the applied potential of 1.5 V vs. Ag/AgCl (Figure 5) according to the following equation:

$$TOF = \frac{Q_{cat} - Q_{blank}}{4 \times F \times \Gamma_{cov} \times t}$$

where, Q_{cat} [mol/cm²] is the charge amount passed during 100 s electrolysis, Q_{blank} [mol/cm²] is the charge amount using a blank meso-ITO electrode, Γ_{cov} [mol/cm²] is coverage of **RuOH** on the electrode, F is Faraday constant and t [s] is electrolysis time (100 s).

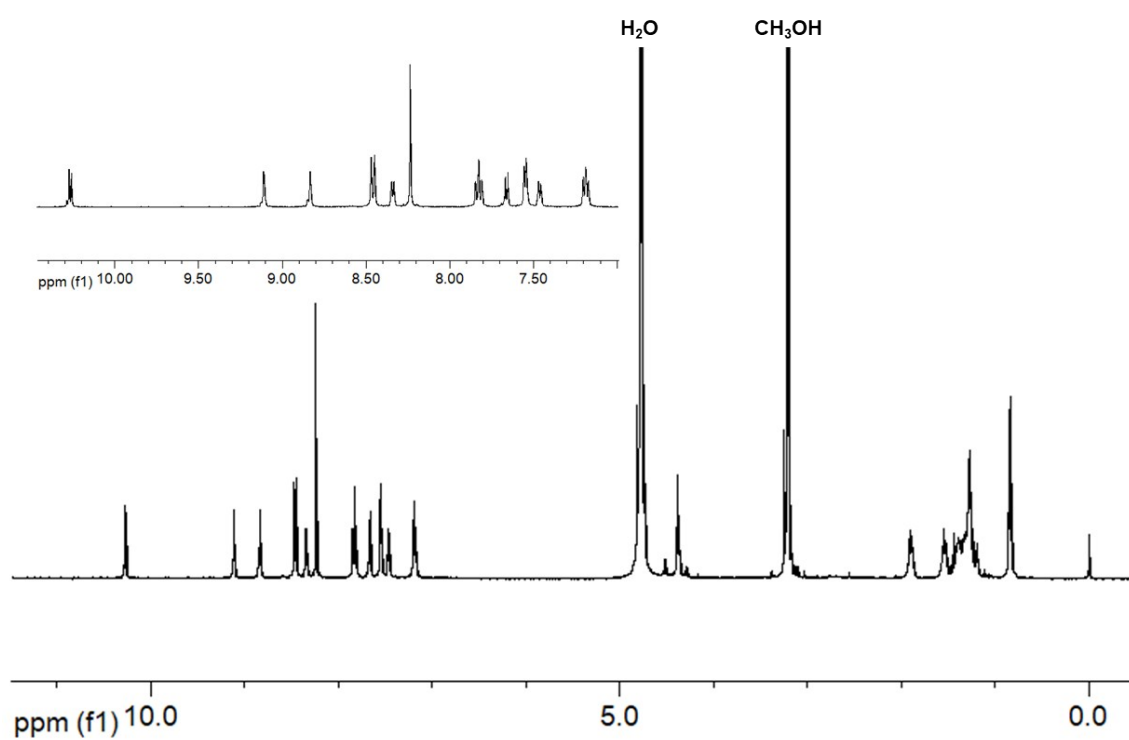


Figure S1. ^1H -NMR spectrum of $[\text{Ru}(\text{C}_8\text{Otpy})(\text{H}_2\text{dcbpy})\text{Cl}]\text{Cl}$ in CD_3OD .

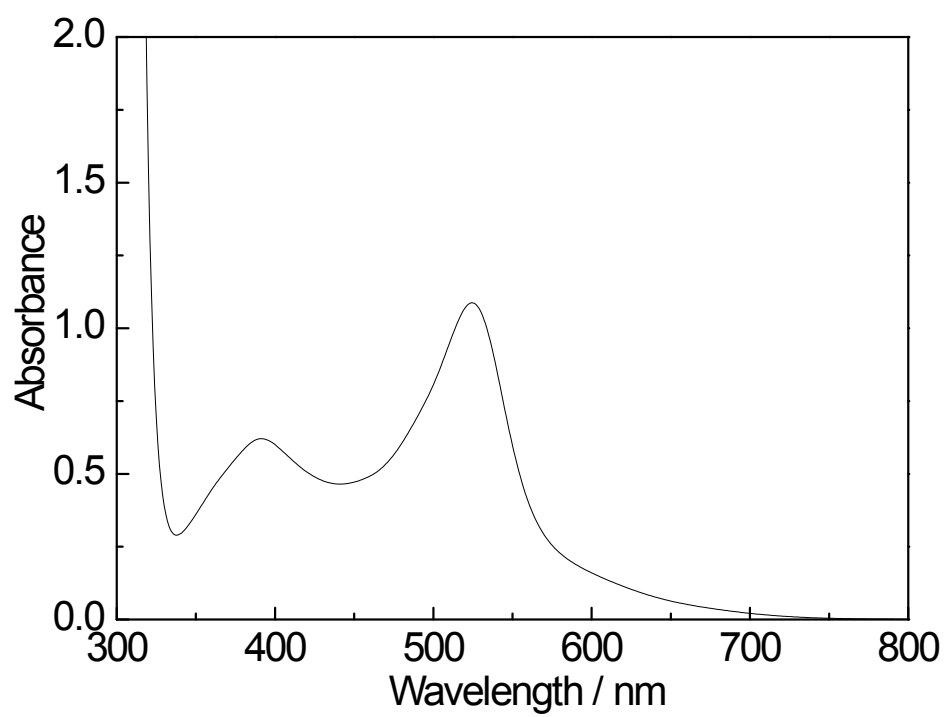


Figure S2. UV-Vis spectrum of $[\text{Ru}(\text{C}_8\text{Otpy})(\text{H}_2\text{dcbpy})\text{Cl}]\text{Cl}$ (0.08 mM) in CH_3OH .

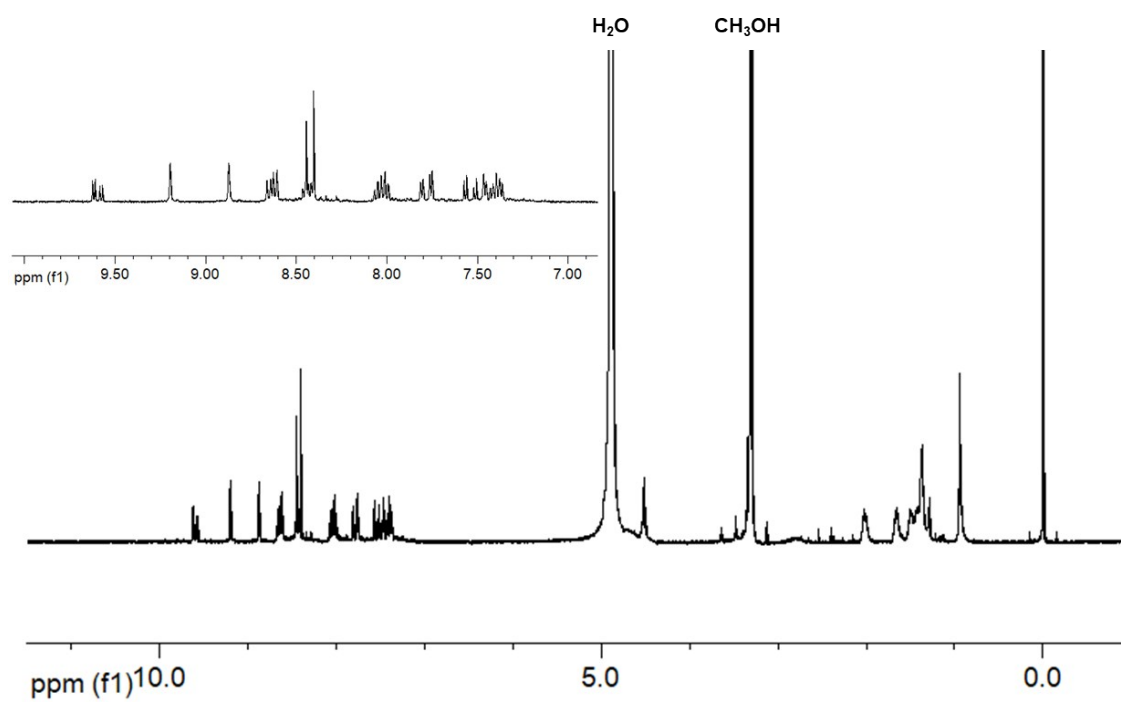


Figure S3. ^1H -NMR spectrum of $[\text{Ru}(\text{C}_8\text{Otpy})(\text{H}_2\text{dcbpy})(\text{OH}_2)](\text{NO}_3)_2$ in CD_3OD .

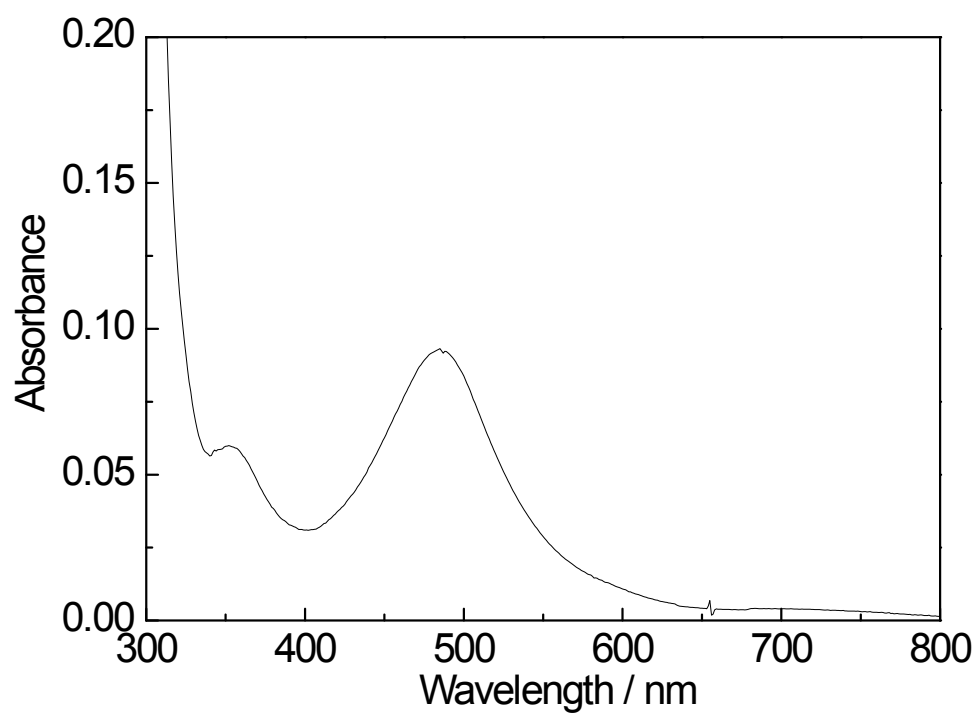


Figure S4. UV-Vis spectrum of [Ru(C₈Otpy)(H₂dcbpy)(OH₂)](NO₃)₂ (0.08 mM) in CH₃OH.

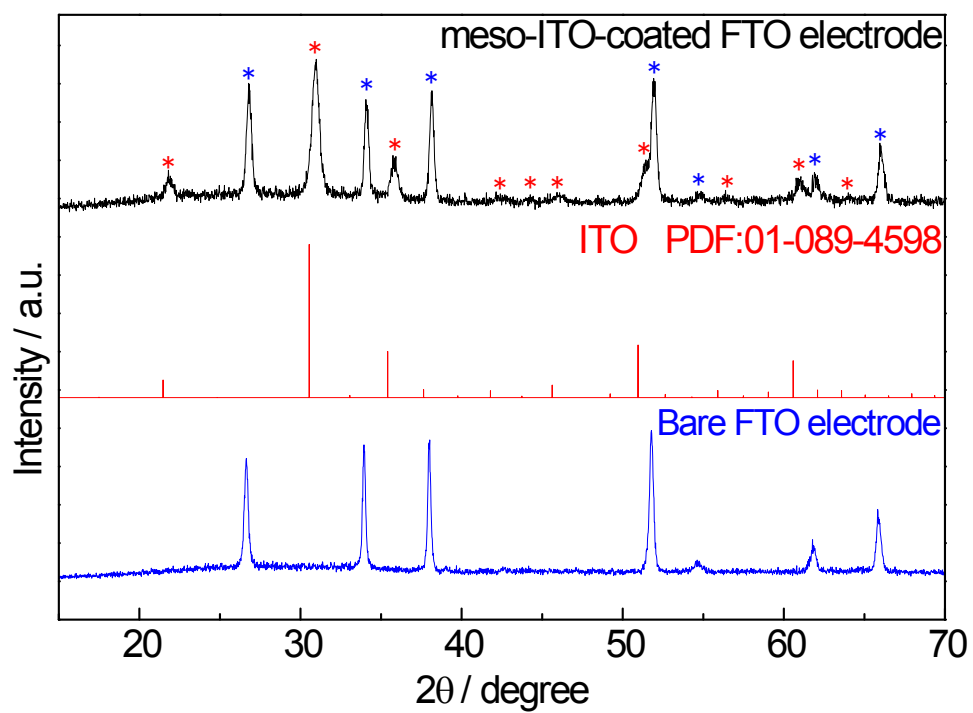


Figure S5. XRD patterns of a mesoporous ITO electrode. The peaks for ITO and FTO were marked by the blue and red asterisks, respectively.

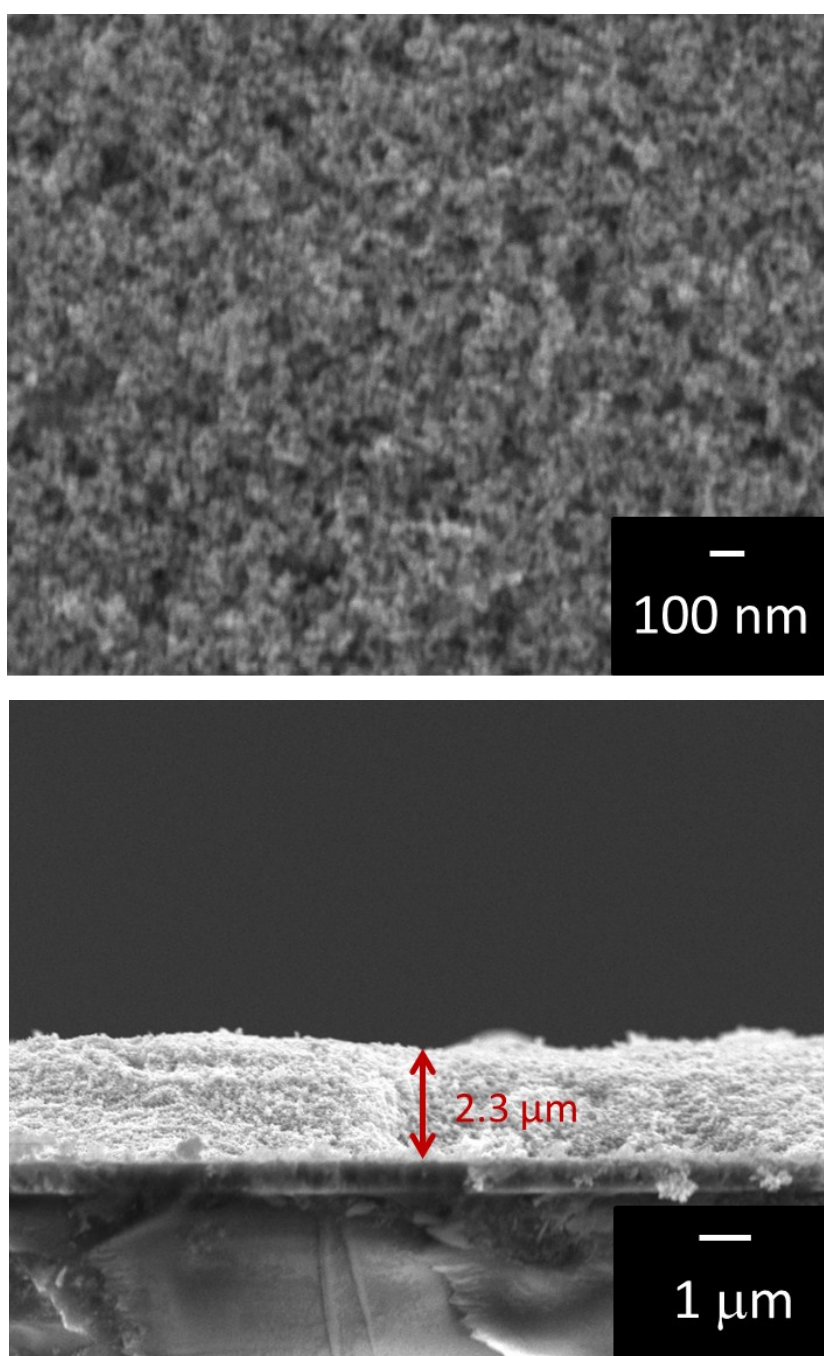


Figure S6. FE-SEM images of the surface (upper) and cross-section (lower) of a mesoporous ITO electrode.

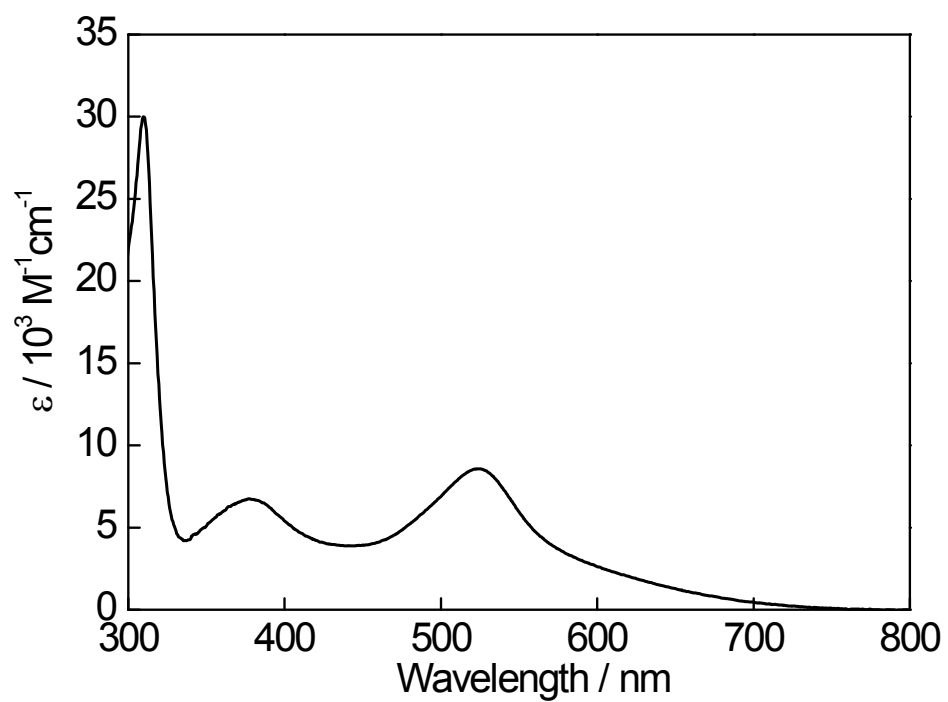


Figure S7. UV-Vis spectrum of $[\text{Ru}(\text{C}_8\text{Otpy})(\text{dcbpy})(\text{OH})]^-$ (0.118 mM) in 2 M KOH.