Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Electronic Supplementary Information for

Structure Determination and Negative Differential Resistance of Tetraarylporphyrin / Polyoxometalate 2:1 Complexes

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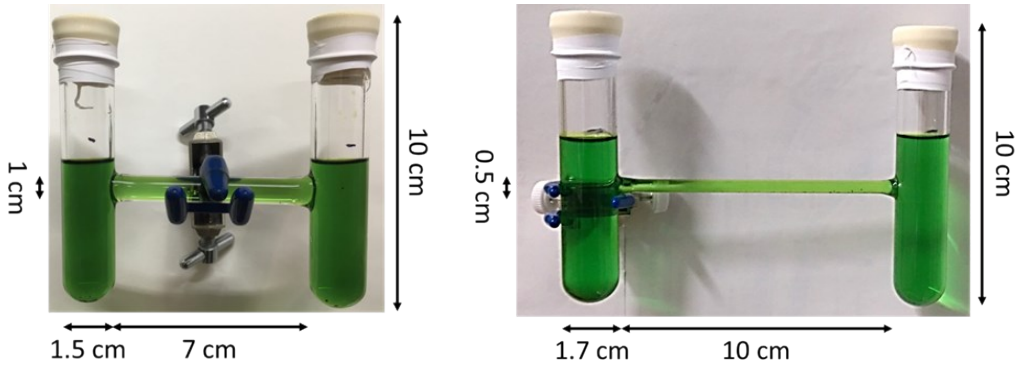

Figure S1. Photographs of H-shaped glass tubes used for making single crystals of porphyrin / polyoxometalate complexes.

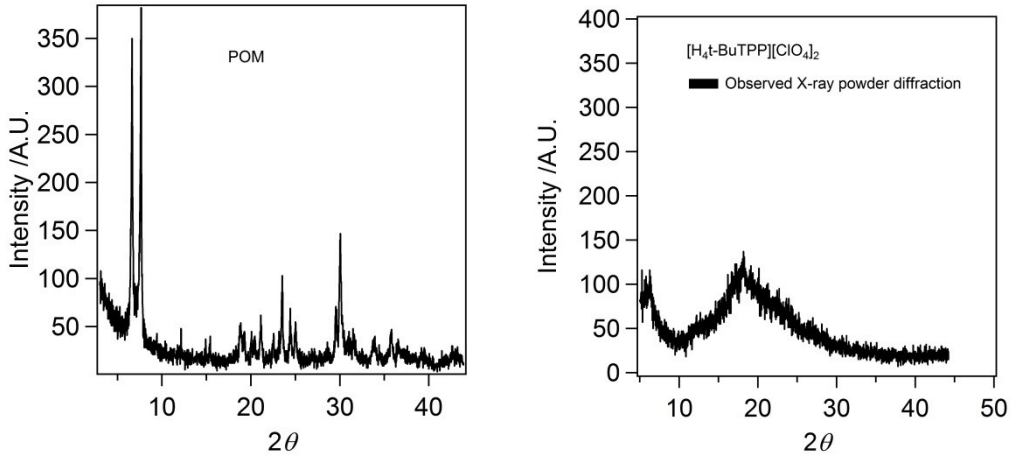

Figure S2. X-ray powder diffraction of POM ($[n\text{-}Bu_4N]_4[SV_2W_{10}O_{40}]$) and $[H_4t\text{-BuTPP}][ClO_4]_2$.

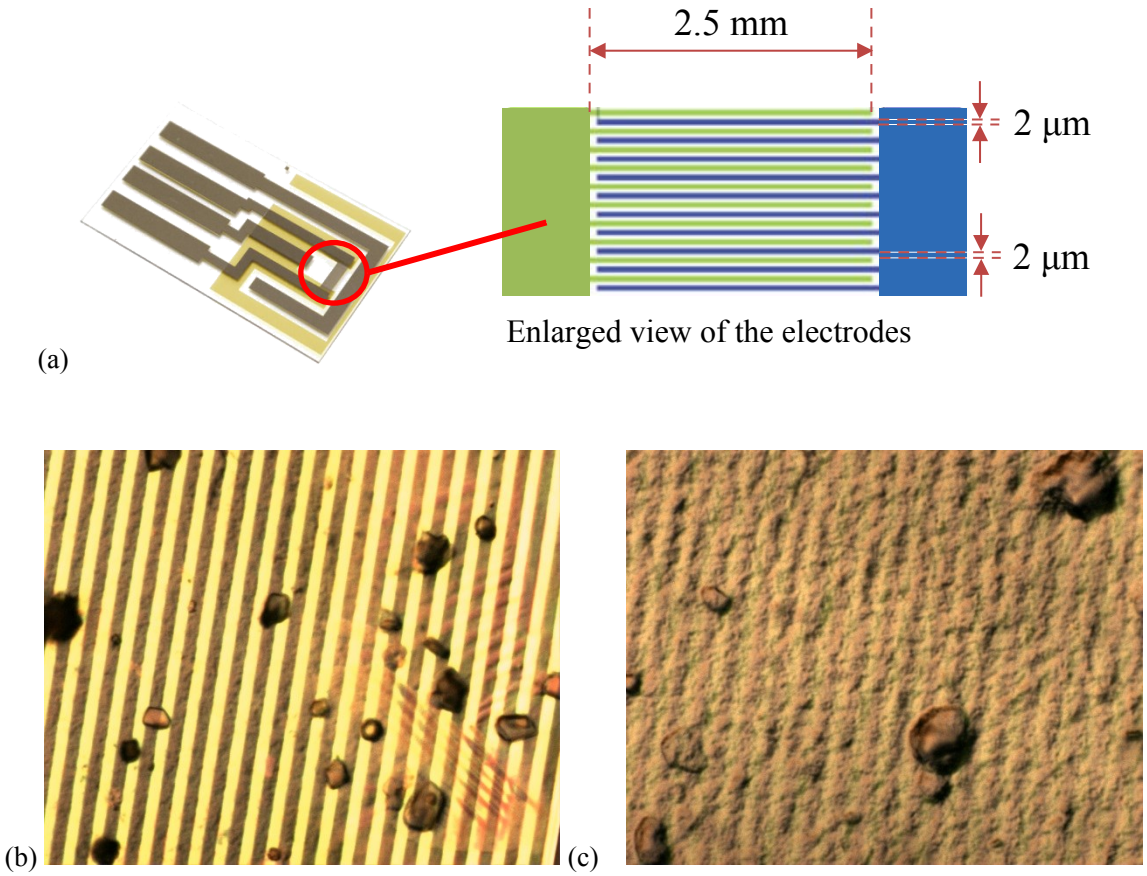

Figure S3. (a) Schematic structure of the electrodes. The electrodes are made from platinum metal, 65 electrodes with the width of 2 µm, the length of 2.5 mm are staggered with the gap of 2 µm. (b) Optical microscopic images of the electrodes after two drop casting and (c) four drop casting of the samples.

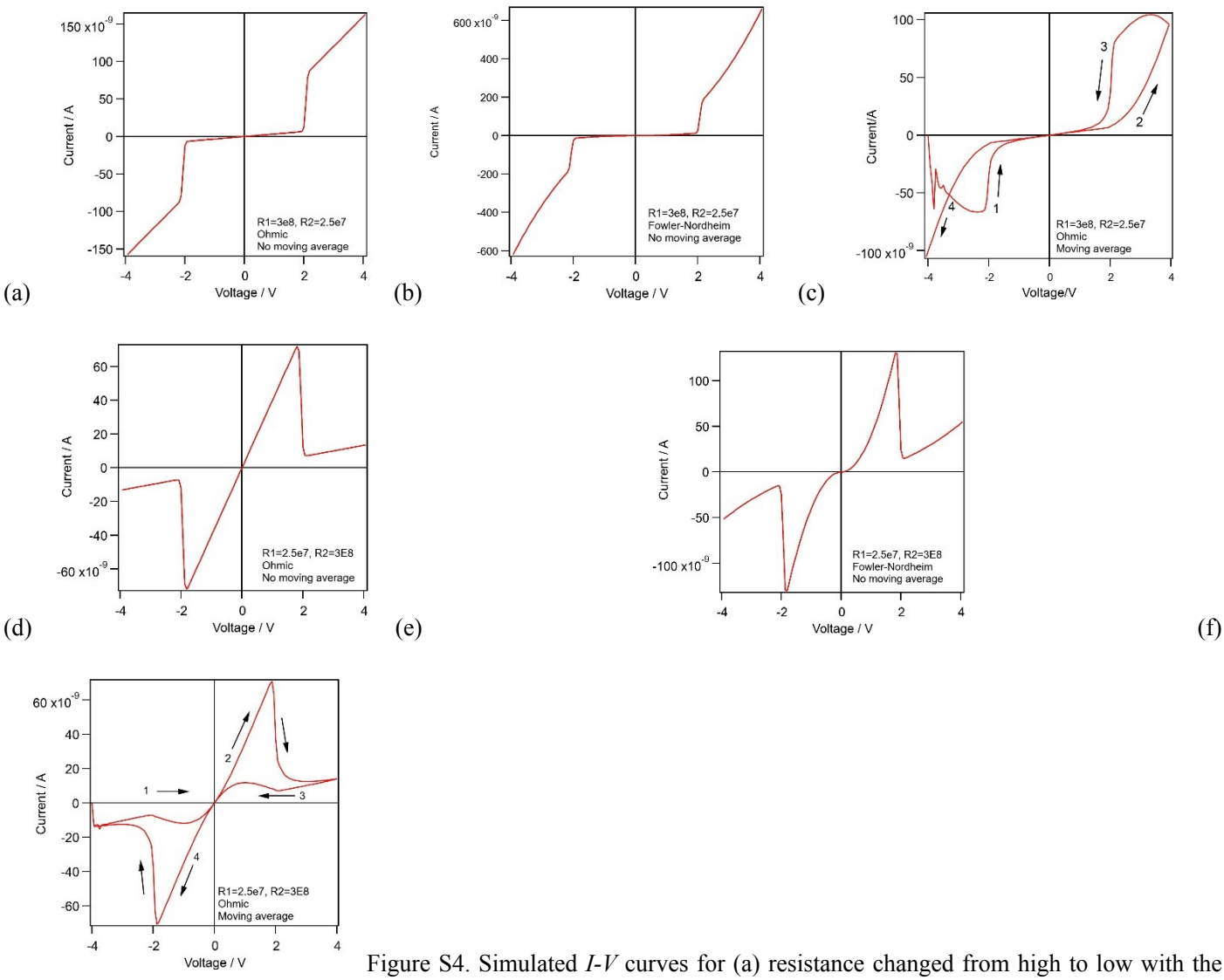

Figure S4. Simulated *I-V* curves for (a) resistance changed from high to low with the Ohmic law, (b) resistance changed from high to low with the Fowler-Nordheim mechanism, (c) resistance changed from high to low with the Ohmic law and slow conversion, (d) resistance changed from low to high with the Ohmic law, (e) resistance changed from low to high with the Fowler-Nordheim mechanism, and (f) resistance changed from low to high with the Ohmic law and slow conversion.

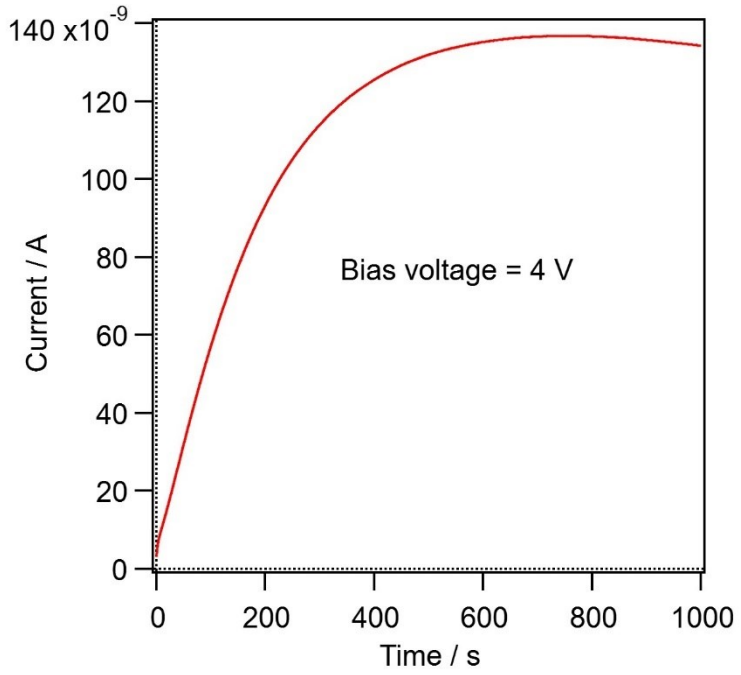

Figure S5. Change of the current of the device made by $[H_4{}^tBuTPP]_2[SV_2W_{10}O_{40}]$, at bias voltage 4V in ambient conditions.

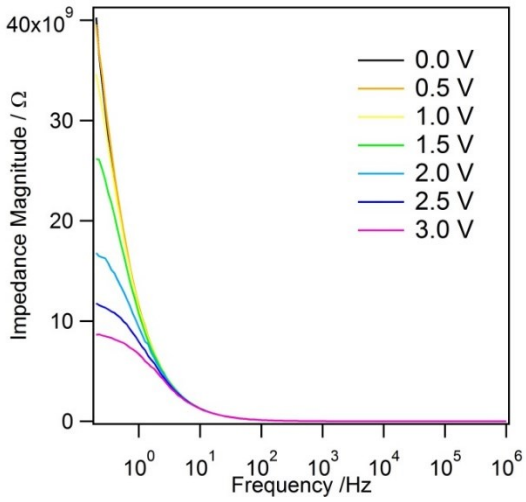

Figure S6. Impedance magnitude vs Frequency graph of the device made by $[H_4{}^tBuTPP]_2[SV_2W_{10}O_{40}]$.