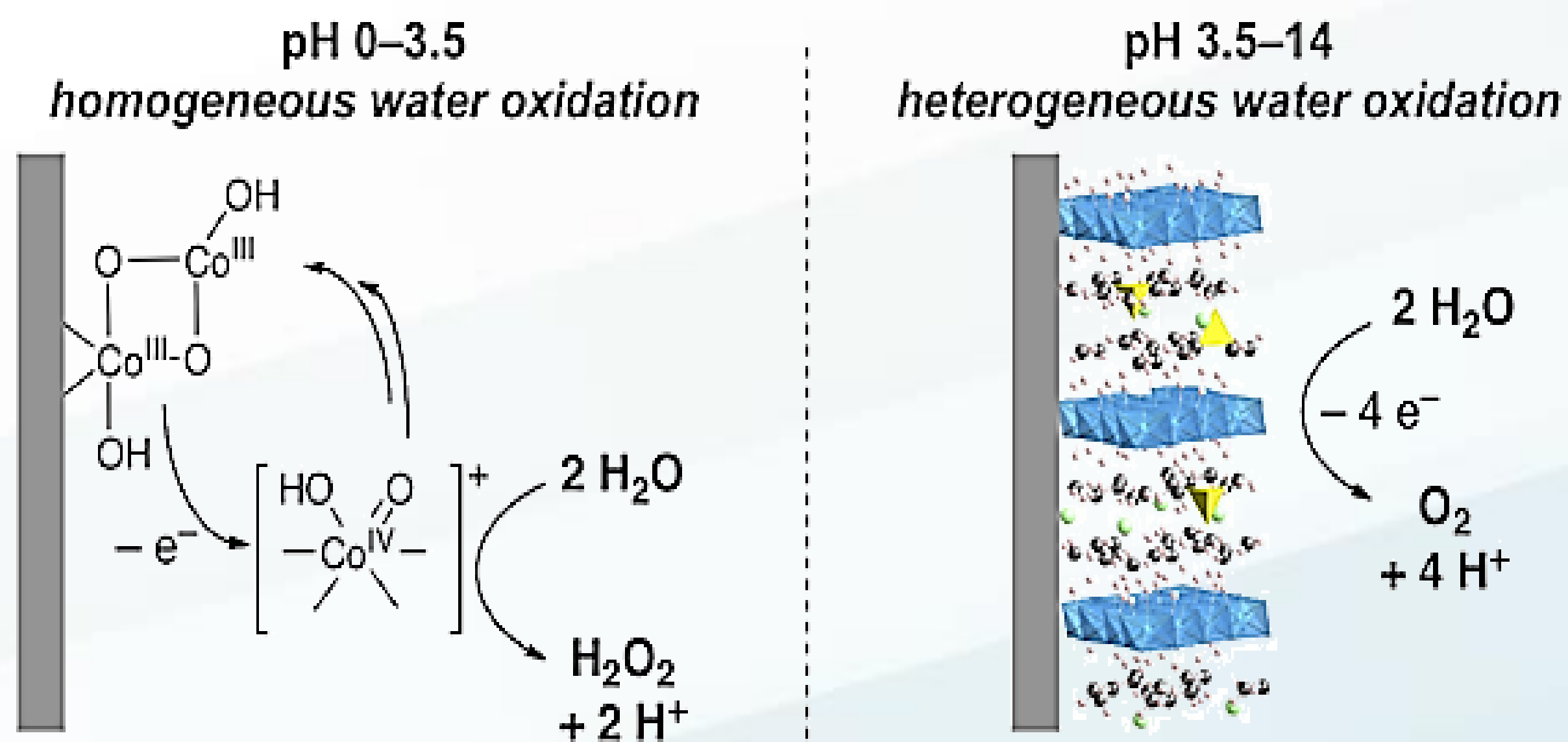


Electrocatalysts for the water oxidation reaction

R. Toth¹, D. K. Bora¹, A. Braun¹, C. Housecroft², E. C. Constable²
¹Empa, ²University of Basel



- Electrocatalysts facilitate redox reactions
- Oxygen evolution, hydrogen evolution and oxygen reduction reactions are relevant for renewable hydrogen economy
- *Design of active materials important aspect of electrocatalysis*
- Integrity and stability of electrocatalysts is a relevant issue
- We present materials and molecular based electrocatalysts

J. Am. Chem. Soc., 2011, 133 (36), pp 14431 - 14442

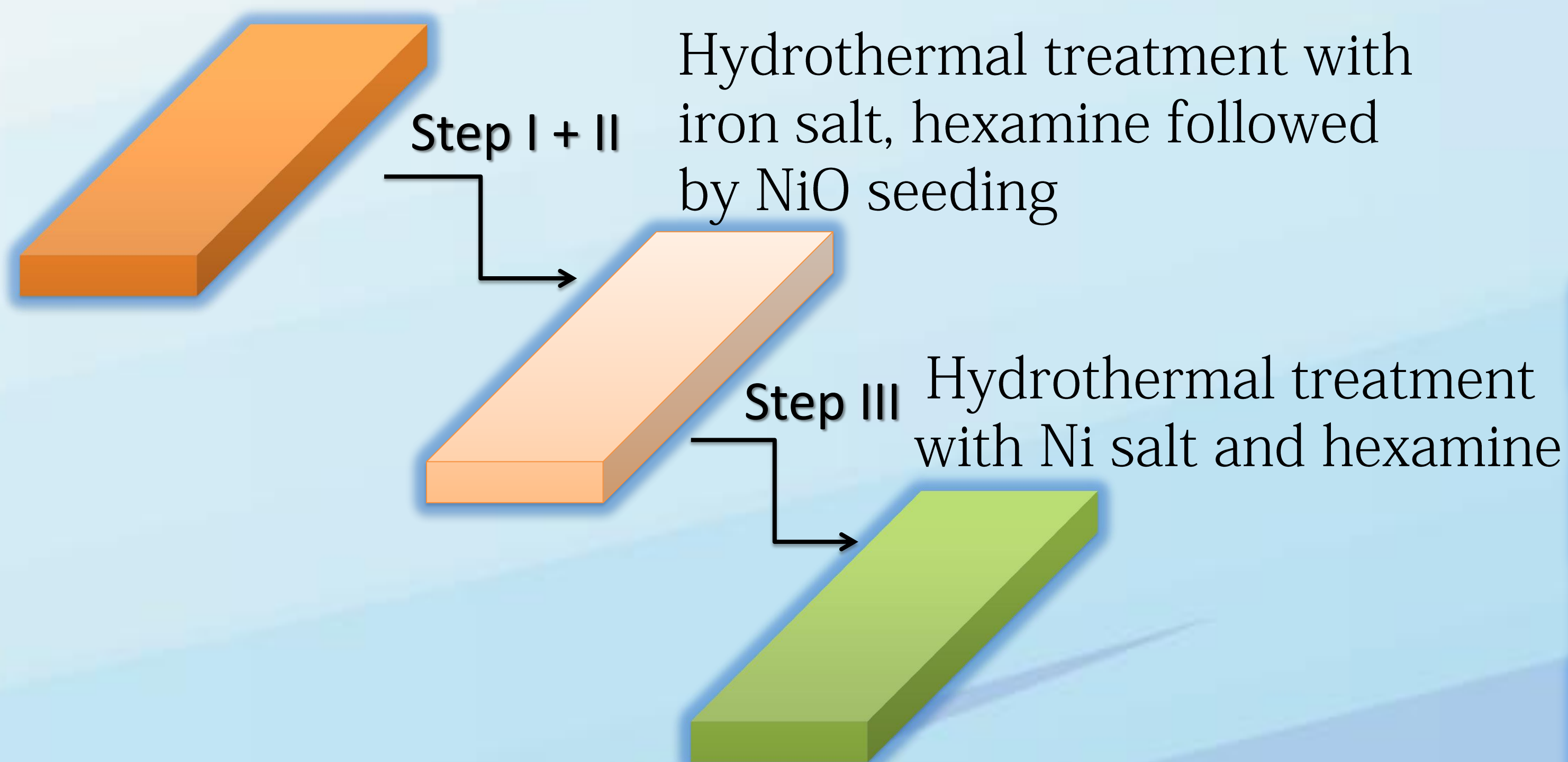


Fig. 1 : Synthesis of Ni(OH)₂ coated electrode

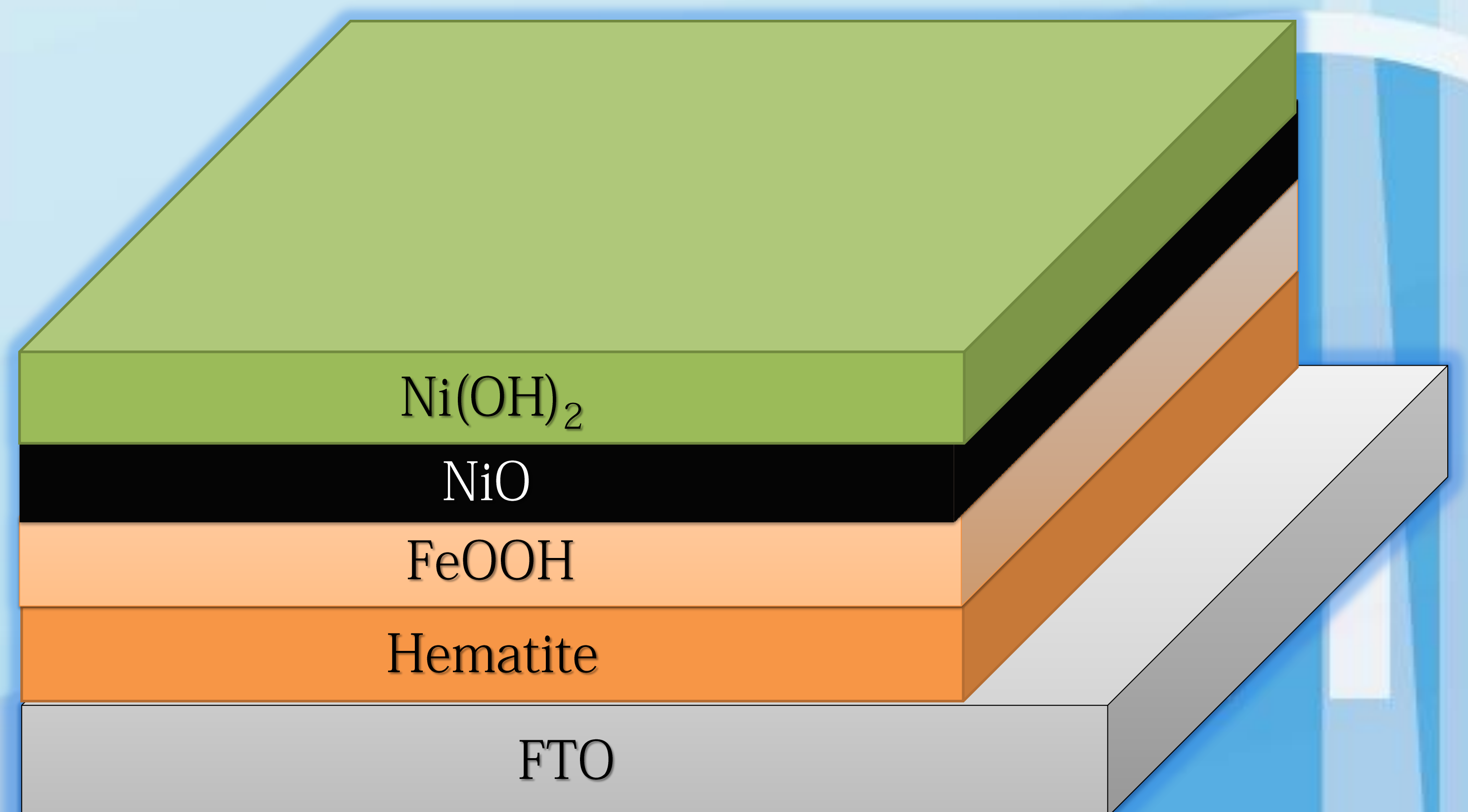


Fig. 2 : Sketch of a Ni(OH)₂ electrocatalyst coated hematite electrode



Fig. 3: MEA development with Ni(OH)₂ electrocatalysts

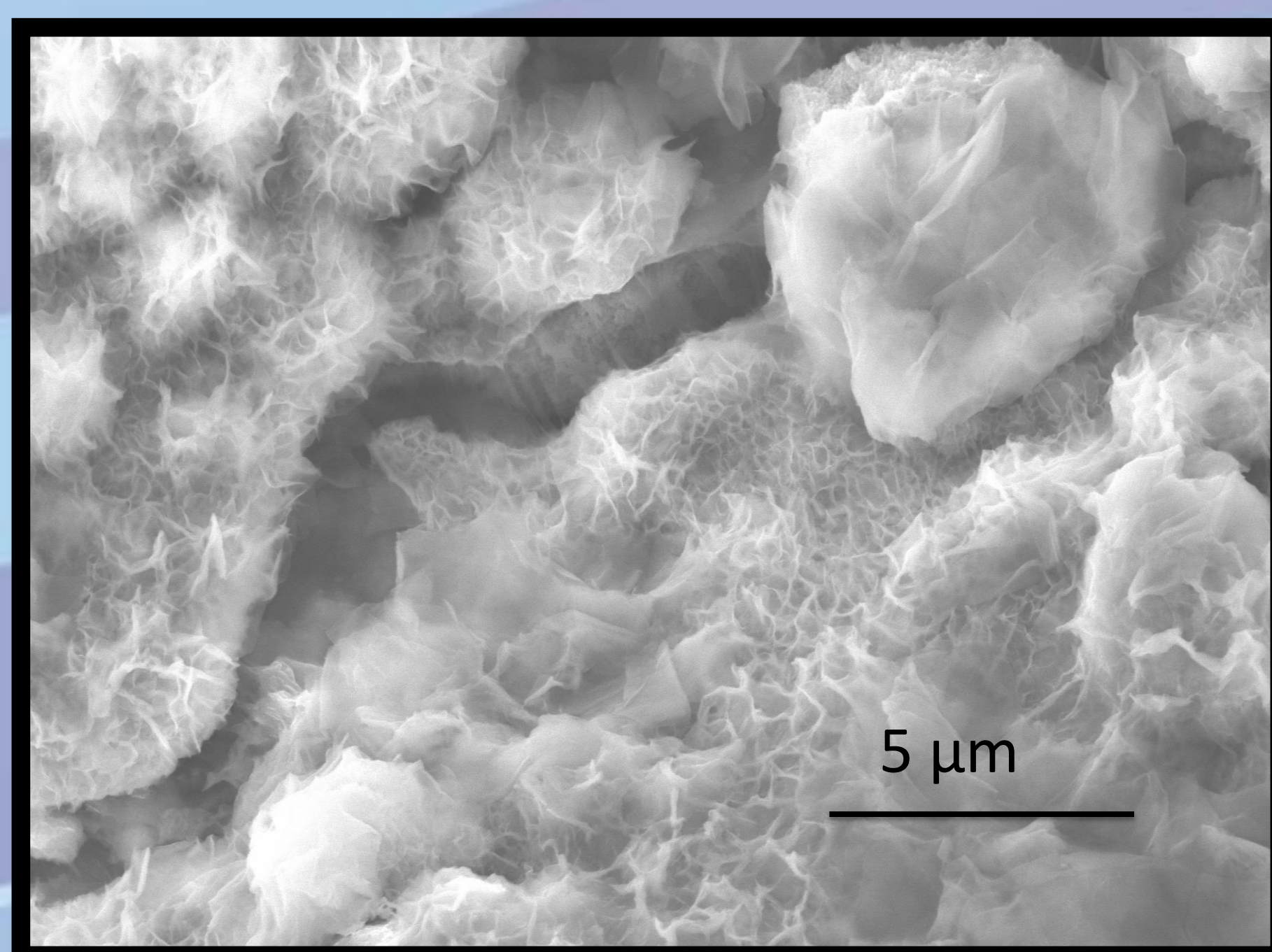


Fig. 4: SEM micrograph of Ni(OH)₂ MEA
MEA - membrane electrode assembly

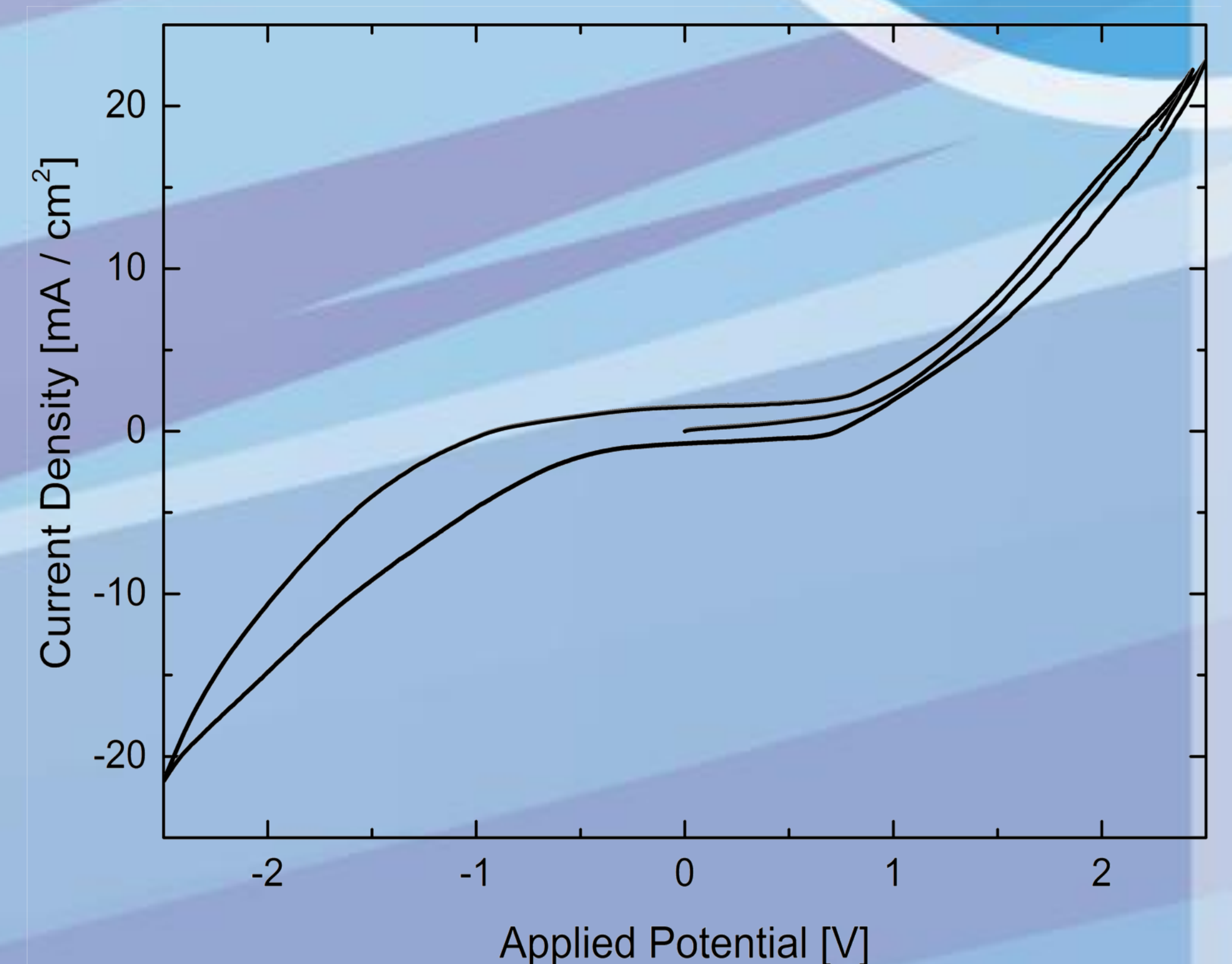


Fig. 5: cyclic voltammogram of Ni(OH)₂ MEA

Self-assembled molecular water oxidation catalyst

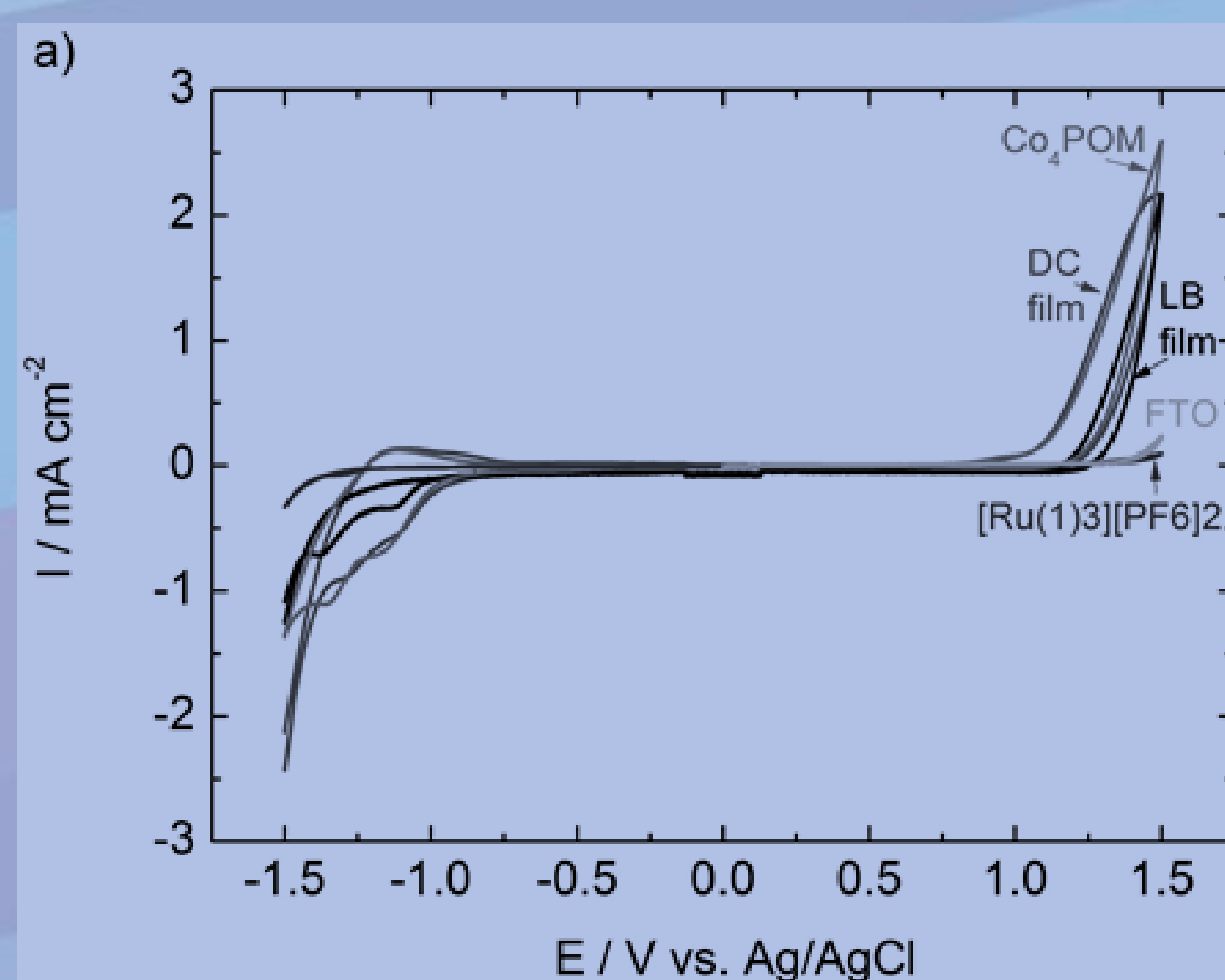
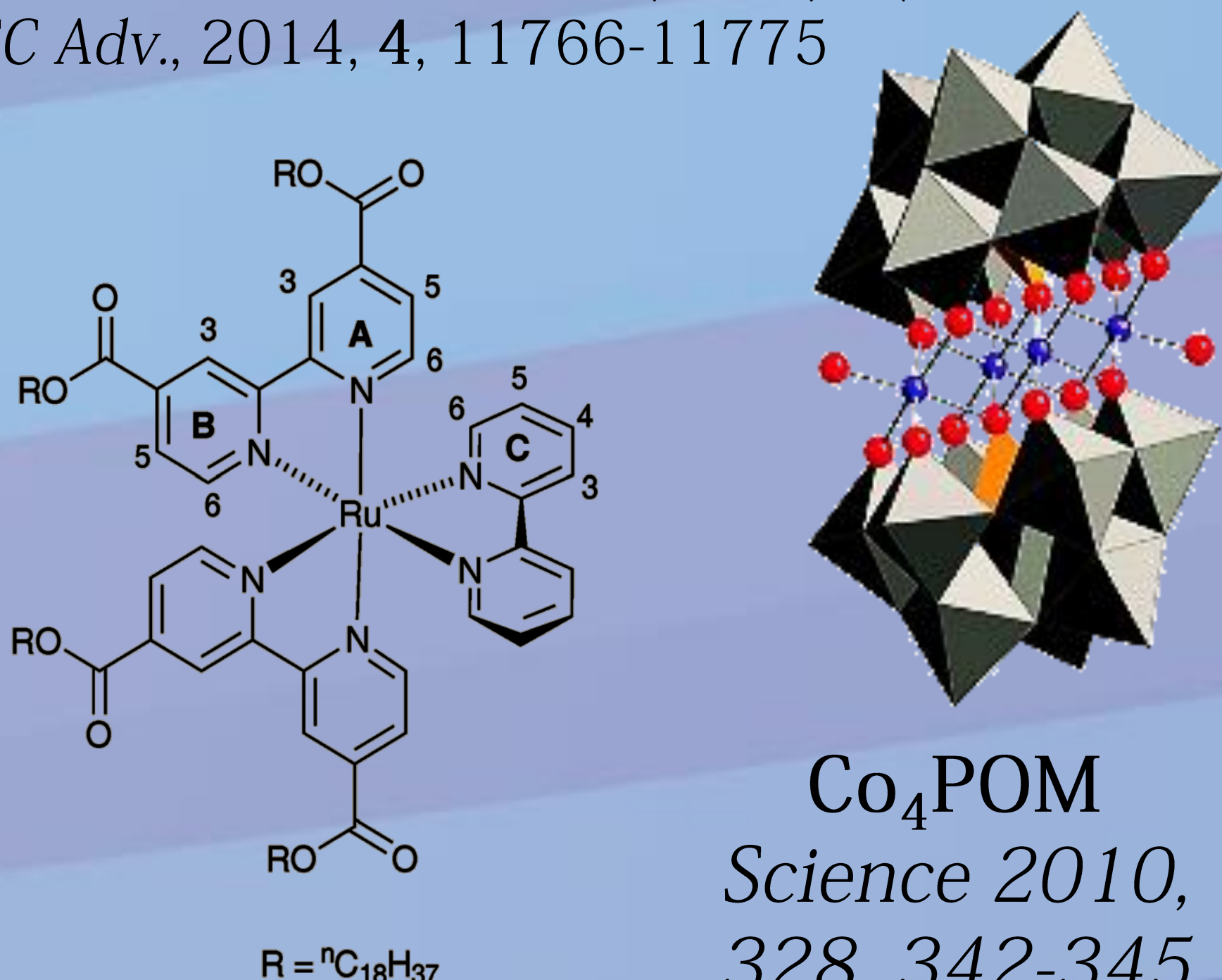
Langmuir-Blodgett (LB) films

of the WOC system:

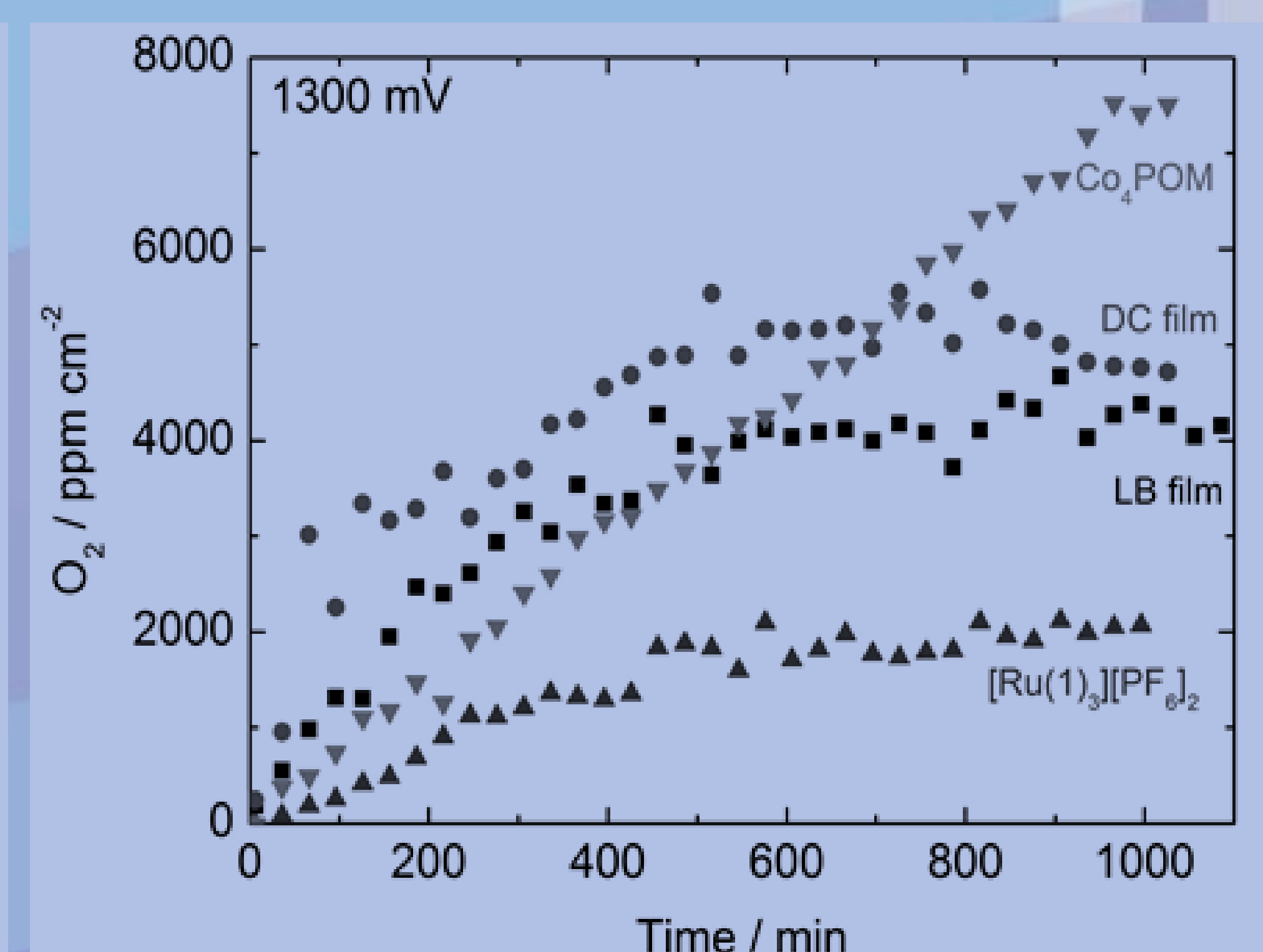
[Ru(1)3][PF6]2 and Co4POM

(Co4POM = K10[Co4(H2O)2(α-PW9O34)2])

RSC Adv., 2014, 4, 11766-11775



Cyclic voltammograms of 50-layer LB and drop cast films of WOC, [Ru(1)₃][PF₆]₂ and Co₄POM on FTO, and bare FTO



O₂ evolution vs time at +1.3 V bias for LB and drop cast WOC films, and separate Co₄POM and [Ru(1)₃][PF₆]₂ films