ELECTROCHEMICALLY DRIVEN WATER OXIDATION CATALYZED BY MANGANESE COMPLEXES

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Hydrogen is a clean and renewable energy source, or rather an energy store, which provides an attractive alternative to fossil fuels [1]. An environmentally friendly method to produce molecular hydrogen is through the oxidation/splitting of water, an abundant natural resource [2]. The major drawbacks associated with the development of catalysts derived from PGM metals are high cost, rarity and toxicity [3]. Our group has drawn inspiration from nature, which utilizes earth-abundant metals (EAMs) in a redox-active coordination sphere to mediate challenging substrate activation and transformation pathways[4-7]. It is therefore advantageous to develop water oxidation catalysts (WOCs) based on cost-effective, nontoxic, and abundant 1st row transition metals. In particular, manganese catalysts are of interest and have shown potential in the development of efficient electrocatalytic water oxidation catalysts [8], however, there is still a lack of electrochemically driven water oxidation processes employing manganese complexes. In light of this, a series of N-(pyrazolyl-1-ylmethyl)pyridine-ligated Mn(I/II) complexes were investigated in the electrochemical water oxidation under various catalytic conditions. The Mn(I/II) complexes show potential as efficient electrocatalytic water oxidation catalysts, which can be achieved by fine-tuning the steric and electronic properties of the catalysts with overpotentials of ~600 mV observed (**Figure 1**).

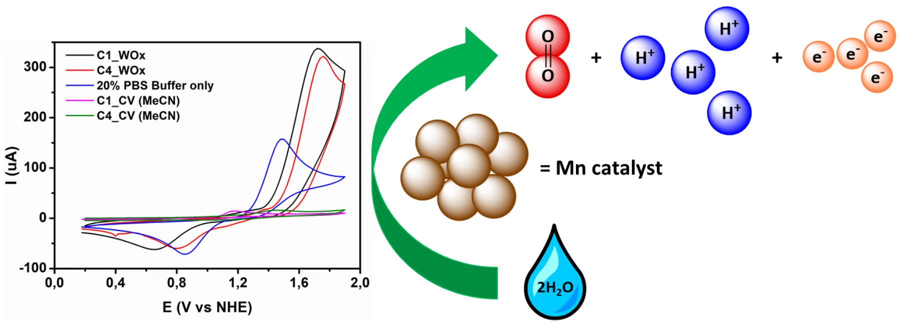

Figure 1: Electrochemical water oxidation using manganese complexes.

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