

## Title

In search for the best catalysts for electrochemical H<sub>2</sub>O<sub>2</sub> synthesis

## Authors

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## Poster presentation

In our group, we study metal complexes for electrochemical H<sub>2</sub>O<sub>2</sub> synthesis in aqueous media. Electrosynthesis of H<sub>2</sub>O<sub>2</sub> can be achieved via either the 2-electron O<sub>2</sub> reduction reaction (2eORR) or the 2-electron water oxidation reaction (2eWOR). Metal complexes suitable for catalyzing these reactions are typically bioinspired and include pyridyl or porphyrin ligands. In this poster, we present our current efforts to design heterogeneous catalysts containing structural motives identical to or reminiscent of that of Cu-tmpa (tmpa = tris(2-pyridylmethyl)amine), the fastest homogeneous 2eORR catalyst known to date.<sup>1</sup> This could be achieved by either directly adsorbing Cu-tmpa on a conducting support material or by preparing electropolymerized films from monomers suitable for producing analogs of the first coordination sphere of Cu-tmpa in the resulting polymer matrix. In envisaged future electrolysis cells for H<sub>2</sub>O<sub>2</sub> synthesis, the 2eORR cathode is coupled to an anode catalyzing the 2eWOR. Therefore, we also present proposals for new potential homogeneous 2eWOR catalysts based on presently known design principles and which we are seeking to prepare.

## Reference

- 1) Langerman, M.; Hetterscheid, D. G. H. Mechanistic Study of the Activation and the Electrocatalytic Reduction of Hydrogen Peroxide by Cu-tmpa in Neutral Aqueous Solution. *ChemElectroChem* **2021**, 8 (15), 2783-2791.