INVESTIGATION OF BIMETALLIC CYCLAM COMPLEXES AS POTENTIAL CATALYSTS FOR CO_2 REDUCTION

Sarah Bimmermann[a], and Ulf-Peter Apfel[a,b]

[a]Inorganic Chemistry I, Ruhr-Universität Bochum, Bochum, Germany
[b]Department of Electrosynthesis, Fraunhofer UMSICHT, Oberhausen, Germany

The utilization of CO_2 as a sustainable carbon source is an urgent topic for the chemical value chain. In this perspective, transition metal complexes often play a crucial role to function as catalyst for the electrochemical and photochemical CO_2 reduction. A widely investigated ligand type within this research is the macrocycle cyclam with its four N-donor atoms.[1] While the corresponding nickel complex is an efficient and selective electrocatalyst for the CO_2 reduction, the cobalt analogue is capable to produce CO via the photocatalytic approach.[2,3] To figure out important key factors, which have a positive effect on the catalysis, ligand modification is an important research topic. Apart from modifications of the cyclam molecule itself, two cyclam molecules can be coupled by different linker units.[4,5] The resulting ligands allow the simultaneous coordination of two metal ions, where the metal-metal distance can be altered by the use of different linkers, expecting an enhanced CO_2 reduction referring to the bimetallic active centers present in CODHs. Within this work, two cyclam molecules were coupled by either a *para- or a meta*-xylene linker and the corresponding homobimetallic nickel and cobalt complexes were tested as potential catalysts for the electrochemical or photochemical CO_2 reduction.

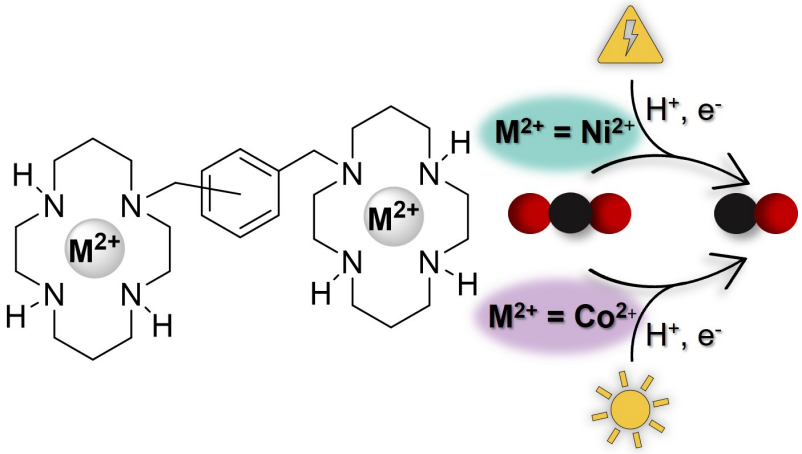

Figure 1. General structure and idea of the application of bimetallic cyclam complexes for the electrochemical and photochemical CO_2 reduction.

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