

A Dinuclear Ruthenium Complex as Electrocatalyst for the Oxidation of Ammonia

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The global climate crisis is the most demanding challenge for our modern civilization. Thus, it is urgent to rethink our ways of energy production. A promising, but yet barely exploited option is the use of ammonia as a fuel, producing unproblematic nitrogen as the only waste product.¹ Our group has contributed to the research field of water oxidation catalysis and has developed a class of highly performing dinuclear ruthenium catalysts based on a robust bis(bipyridyl)pyrazolate ligand backbone.^{2,3} In our recent studies, we aim to extend the scope of these catalysts towards the ammonia oxidation reaction. For this purpose, we have successfully modified our existing systems synthetically in order to create a suitable platform to initiate the electrocatalytic formation of dinitrogen from ammonia (Figure 1, left). Detailed electrochemical (Figure 1, right) and spectroscopic studies give promising indications that our system is an active electrocatalyst at moderate overpotentials, thus paving the way to a class of ammonia oxidation catalysts with a binuclear substrate binding motive.

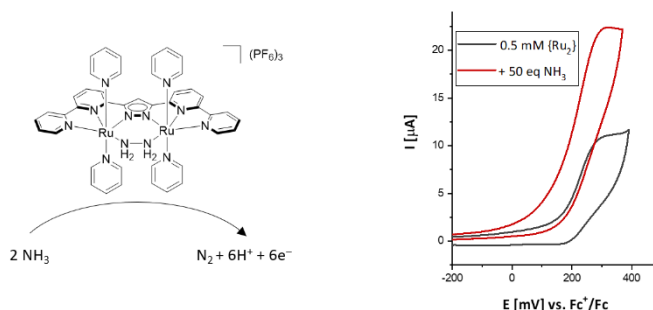


Figure 1: Ammonia oxidation with a binuclear ruthenium complex as potential catalyst (left) and CV experiment indicating the turnover of ammonia in the presence of the catalyst (right).

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