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RESEARCH INTERESTS

- Coordination and organometallic chemistry
- Catalysis
- Surface chemistry
- Bioinspired CO_2 reduction catalysts
- Cluster synthesis

SUMMARY

Despite being the most prevalent greenhouse agent, carbon dioxide has become increasingly recognized as a potentially valuable resource. Its large scale conversion into useful chemicals has the potential to provide cheap and renewable alternatives to fossil fuels. However, the obstacle to this large scale implementation is the development of effective catalysts for CO_2 reduction. To overcome this hurdle, the synthetic chemist can draw a unique inspiration from redox enzymes that catalyze this reaction in nature. For this purpose, we target catalysts based on heteropolymetallic clusters that can activate CO_2 and allow its selective reduction to more chemically valuable products. We focus in particular on the development of catalytic systems combining electron reservoirs with active sites for CO_2 activation. These assemblies will either be directly used as catalysts in solution or will be integrated to electro and photocatalytic devices by covalent grafting on conducting or semi-conducting surfaces.

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