



Title: Support, Alloying and Promoter Effects and Active Sites in CO₂ Hydrogenation

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CO₂ valorisation as a low, or even negative-cost feedstock, has gained a lot of attention recently. The use of CO₂ as C-containing feedstock can be a means for the abatement of CO₂ as an environmental pollutant during the search for, and scale up of, fossil fuel alternatives. Hydrogenation of CO₂ is a reaction with the potential to be applied in this concept, because of its ability to reduce the negative impacts of CO₂ point sources. Required hydrogen for this reaction can be produced by water electrolysis using surplus energy from renewable energy sources, which - as a result - allows demodulation of the mismatch in renewable electricity demand and supply.

During my research I will focus on support, alloying and promoter effects and active sites in CO₂ hydrogenation in order to spatially resolve the activity of CO₂ hydrogenation over supported Ni catalysts. To achieve this, we will use both ab-initio simulation methods and spectroscopic techniques, such as vibrational, electronic, microscopic and synchrotron-based methods. This will allow us to gain topological information of adsorbed species, which can potentially reveal the location of the active sites, and their relative amount.