Catalytic Reduction and Conversion of Small Molecules (CO2, SO2, N2O)

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Most of our chemical commodities relies on non-renewable resources and in particular on the oxidation of hydrocarbons. The need to find novel and renewable feedstocks for the production of both bulk and fine chemicals have led the chemical community to consider starting materials of high oxidation states such as CO_2 or biomass. In this context, reductive strategies to convert these in valuable chemicals have emerged.

Over the last years, our group has intensively worked on the development of catalytic systems to reduce C–O and C=O bonds, allowing the reductive functionalization of CO_2 in a so-called diagonal approach,[1] as well as the recycling of oxygenated polymers.[2] Thus, reactions involving mild reducing agents such as silanes or boranes in presence of organo- or organometallic catalysts have been developed.[3] Recent extensions of this methodology also enabled the reduction of other oxygenated compounds, with the direct synthesis of sulfones from SO_2[4] and the reduction of N_2O.[5]

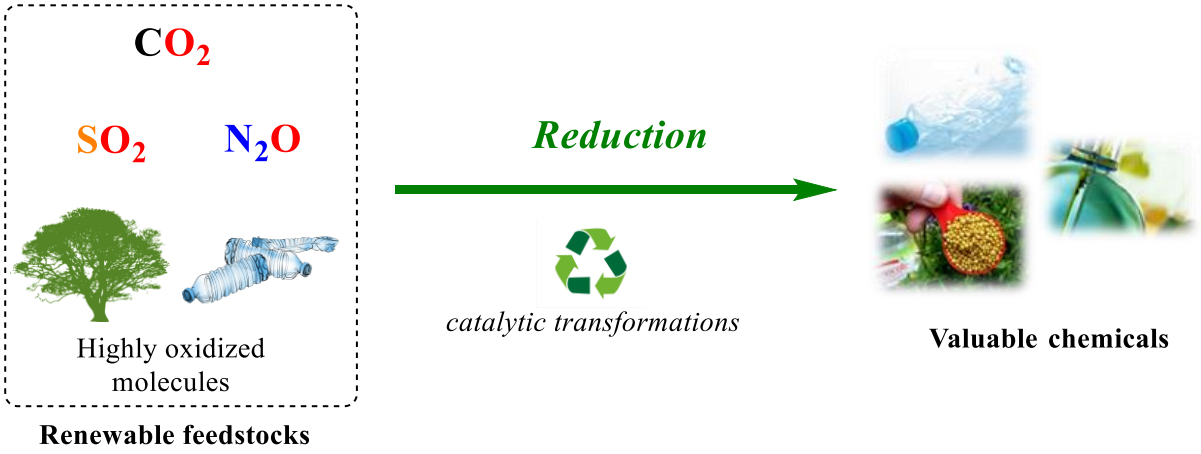

Figure: Catalytic reduction and conversion of oxidized molecules towards the synthesis of valuable chemicals.

[1] C. D. Gomes, O. Jacquet, C. Villiers, P. Thuery, M. Ephritikhine, T. Cantat, *Angew. Chem. Int. Ed.* **2012**, 51, 187-190.
[2] L. Monsigny, J.-C. Berthet and T. Cantat, *ACS Sustainable Chem. Eng.* **2018**, 6, 10481-10488. L. Monsigny, E. Feghali, J.-C. Berthet and T. Cantat, *Green Chem.*, **2018**, 20, 1981-1986.
[3] O. Jacquet, X. Frogneux, C. D. Gomes, T. Cantat, *Chem. Sci.* **2013**, 4, 2127-2131; E. Blondiaux, J. Pouessel, T. Cantat, *Angew. Chem. Int. Ed.* **2014**, 53, 12186-12190; S. Savourey, G. Lefevre, J. C. Berthet, P. Thuery, C. Genre, T. Cantat, *Angew. Chem. Int. Ed.* **2014**, *53*, 10466-10470.
[4] N. von Wolff, C. Char, X. Frogneux, T. Cantat, *Angew. Chem. Int. Ed.* **2017**, 56, 5616-5619.
[5] *Unpublished results.*