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C0₂ and formic acid, a winning couple in reduction chemistry

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INOR: Division of Inorganic Chemistry

102 - CO₂ and formic acid, a winning couple in reduction chemistry

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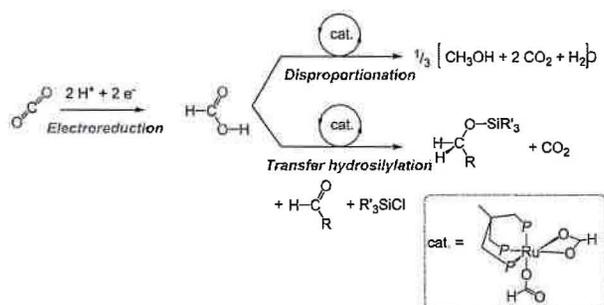
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Abstract:

Because it is abundant, inexpensive, low-toxic and renewable, CO₂ is an attractive carbon feedstock and its conversion has motivated recent efforts both in the academia and in the industry. Nonetheless, major advances are still hampered by the kinetic inertness of CO₂ and efficient catalysts are still to be needed to promote the reduction of CO₂ to reduced products, such as methanol.

We have recently shown that formic acid (HCOOH), obtained from the 2-electron reduction of CO₂, can serve as an efficient C-H bond shuttle and reductant in the reduction of CO₂ to methanol. Using ruthenium(II) complexes, supported by a triphosphine ligand, formic acid can undergo a disproportionation reaction to methanol in high yields. In the presence of chlorosilanes, the same catalytic system is able to facilitate the reduction of aldehydes and CO₂, exemplifying the role of formoxysilane in transfer hydrosilylation chemistry for the first time.



Utilization of formic acid as a C-H bond shuttle in disproportionation and transfer hydrosilylation reactions

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