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Hydrogenation complementing the generation of H2: On the way to green chemistry

First, cyclopentadienone iron dicarbonyl complexes were applied in the alkylation of ketones with various aliphatic and aromatic ketones and alcohols via the borrowing hydrogen strategy in mild reaction conditions. These iron complexes demonstrated a broad applicability in mild conditions and extended the scope of substrates. Then a general iron-catalyzed chemo- and diastereoselective reduction of unsaturated ketones into the corresponding saturated ketones in mild reaction conditions. On the other hand, the hydrogenation of nitrous oxide by pincer ruthenium complexes supposes a promising way to functionalize a hazardous gas and reduce the greenhouse effect, generating dinitrogen and water. The particular PCsp2P ligand (see Figure 1a), which is not a simple spectator, but it directly assists in the formation of a characterized epoxide complex, affording the N2 release if N2O is used as a reactant. Next the hydrogenation is undertaken with H2 as a reactant, generating water as a main product. All these statements are discussed mechanistically, by means of DFT calculations. The stoichiometric nature of the reaction described here is rationalized by the competition between N2O and H2 to react with the PCP iridium pincer complex.

Biography

Albert Poater has completed his PhD at the age of 25 years from Universitat de Girona and postdoctoral studies from University of Salerno, Italy, and has been invited researcher at KAUST, Saudi Arabia and LCC-Toulouse, France. He is co-author of 177 papers, highlighting 5 Angew. Chem. Int. Ed. and 14 J. Am. Chem. Soc. In total he counts with nearly 6000 citations with H = 45. Further, he also is a member in the ACS since 2012, as well as editor of Catalysts and International Journal of Molecular Science.

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