Homogeneous Metal Catalysis:

from Sustainable Transformations to Supramolecular Approaches

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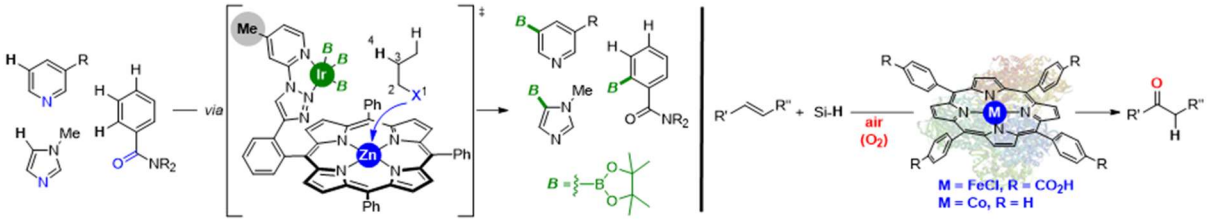
The generation of more efficient, atom- and step-economy transformations is of primary importance to meet the societal challenges associated the 21st century. In this context, transition metal catalysis is an enabling technology and, in our laboratories, we have developed a number of sustainable approaches dealing with C-H bond functionalizations, one-pot multi-step sequences, direct reductive aminations, amongst others.[1] They aim at minimizing chemical wastes while controlling metal's reactivity. On another hand, we have developed metal-catalysed transformations which are controlled by remote, kinetically labile interactions taking place in the secondary coordination sphere of the metal catalyst.[2] In particular, we have exploited the reversible coordination bonds between nitrogen- or oxygen-containing substrates and metalloporphyrins as a tool for the design of supramolecular catalysts.[2] These supramolecular catalysts feature unique atom-precise selectivities for C-H bond functionalization besides displaying enzyme-like behaviours.[2] Lastly, the C-H oxidase behaviour of iron- and cobalt-porphyrin catalysts for the industrially-relevant Wacker-type oxidation of olefins into ketones will be shown,[3] which is important for replacing Pd catalysts.



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