Advanced sustainable industrial catalysis: manganese complexes with bulky DAB ligands for ketone hydroboration

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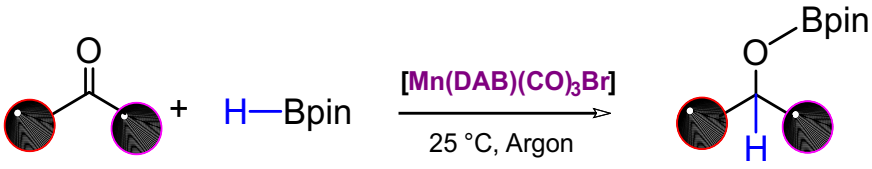
Homogeneous catalysis plays a crucial role in the synthesis of industrially relevant chemical compounds, including those used in the production of pharmaceuticals, fertilizers, and food additives [1]. These processes are most commonly catalysed by noble metals complexes [2], which - despite their high activity and selectivity – have significant drawbacks, particularly regarding environmental impact, and limited natural abundance. Manganese-based coordination compounds have emerged as a promising and sustainable alternative due to the high availability of manganese in the Earth's crust, its low toxicity, and its ability to adopt multiple stable oxidation states [3]. Notably, manganese catalysts may not only serve as substitutes for noble metals in catalytic systems but, in some cases, even surpass them in terms of reactivity and selectivity [4].

Among various ligand architectures, N,N-donor ligands have attracted considerable attention owing to their excellent coordination capabilities [4] and distinctive redox characteristics [5], which enable the effective exploitation of the catalytic potential of non-noble metals. Nevertheless, despite these advantages, the application of such ligands within manganese coordination chemistry remains comparatively underexplored [5].

This presentation will discuss the synthesis, characterization, and properties of a novel class of manganese complexes with the general formula [Mn(DAB)$(CO)_3$Br], bearing sterically demanding 1,4-diaza-1,3 butadiene (DAB) ligands [6]. The catalytic application of these complexes in the hydroboration of ketones, an industrially important transformation that enables the facile and efficient synthesis of boron esters under mild, environmentally benign conditions consistent with the principles of green chemistry, will also be reported.



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