Catalysts for a more sustainable chemistry

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Dwindling reserves of crude oil and other fossil carbon sources combined with environmental concerns have resulted in a call for the use of alternative, preferably renewable, resources. Aside from fuel, ultimately a wide variety of chemical feedstocks is derived from fossil sources. Renewable lignocellulosic materials or waste are abundantly available,[1] indigestible and therefore not useful as food products, and can be processed to give alcohols and polyols.[2] Thus, there is a high demand for new reactions that utilize alcohols and convert them into key chemicals.[3]

Recently, our group introduced the concept of acceptorless dehydrogenative condensations (ADC) for the catalytic synthesis of important aromatic N-heterocyclic compounds like pyrroles [3] and pyridines.[4] In such ADC reactions, alcohols become selectively hetero-connected via C-C and C-N bond formation steps. The deoxygenation of alcohols takes place via condensation steps and liberation of H_2 leads to aromatization.

In the talk, the development of (i) the ADC concept, (ii) novel ADC reactions, (iii) robustly supported reusable catalysts for ADC, (iv) base metal catalysts,[5,6] and (v) novel catalytic concepts possible due to progress made in ADC recently, are discussed.

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