Recent Advances in Sustainable Catalysis by Pincer Complexes

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Design and development of sustainable, environmentally benign catalytic reactions for organic synthesis and for energy-related processes are major goals of current catalysis. We have developed new efficient, environmentally benign reactions catalyzed by pincer-type transition metal complexes, including complexes of earth-abundant metals. Several of these reactions either produce hydrogen gas or consume it and proceed by a new mode of metal-ligand cooperation. Metal-complex catalyzed reactions, in which most of the catalytic activity is ligand-based, were also developed. Various synthetic and energy-relaed applications based on these catalytic reactions, such as several acceptorless dehydrogenative coupling reactions, selective oxidation of organic compounds using water as oxidant, and new liquid organic hydrogen carriers (LOHCs), will be described.