PhD subject

Metal-catalyzed regioselective C-H functionalization of carboxylic acid *via* a heterodimer strategy

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Research topic:

Catalysis is one of the fundamental pillars of green chemistry and thus one of the most attractive fields in chemistry. Among this area, C–H activation has significantly grown in importance during the last decade. Indeed, the direct functionalization of C–H bond allows a fast access to complex molecules without the introduction of an activated group which is important from an atom economy point of view.

Due to the large number of C–H bonds in molecules, C–H activation strategies are often very challenging. Over the last decade, *ortho*-C-H activation of aromatic compounds have been extensively studied,[1] especially for carboxylic acids.[2] While the C-H activation of aliphatic carboxylic acids remains relatively underdeveloped, notable progress has been achieved by leveraging the carboxylic acid functionality as a directing group.[3]

Interestingly, recent studies have indicated that in presence of hindered phosphoric acid, carboxylic acids were forming heterodimers.[4] In this project, we are planning to take advantage of this heterodimer formation and use phosphoric acid as co-catalyst to activate specific C–H bond of carboxylic acids by introducing a suitable group in 3 and 3' position of the phosphoric acid (figure 1). In addition, thanks to the atropoisomerism of classical binol-based phosphoric acids, enantioselective transformations will be considered.

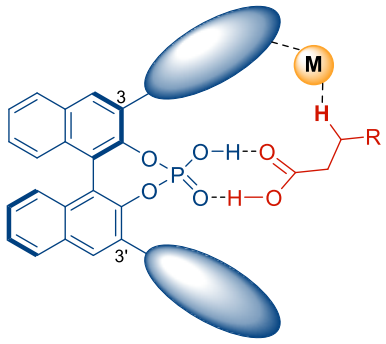

Figure 1. Model for asymmetric C–H activation of carboxylic acids

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