An Attempt for Umpolung NHC Catalyzed $CO_2$ Fixation of Aldehydes and Alpha Keto Acids’ Electrochemical Activity

Using carbon dioxide ($CO_2$) as a renewable building block for organic compounds has been of interest in the last decade. Due to its high stability, it must first be activated for it to react. N-Heterocyclic carbenes (NHCs) have been widely used and have major applications in organocatalysis, for example, as a trigger in umpolung reactions of aldehydes. In addition, NHCs have been used to activate $CO_2$. In this work, the combination of these reactivities was applied to attempt the NHC catalysed carboxylation of aldehydes to form alpha-keto acids. The further reactivity of alpha keto-acid was also studied. Electrochemical activity of alpha keto acids was identified and may lead to using them as acylation-agent alternatives to previously known methods.