Sustainable Catalysts for the fixation of Carbon Dioxide and Carbon Monoxide as C-1 sources to synthesize the Value Added Chemicals

Bhalchandra M. Bhanage, [a]* **Vitthal B. Saptal** [a]

[a] *Department of Chemistry, Institute of Chemical Technology, Mumbai India*
Fax number+91-22 33611020 E-mail address: bm.bhanage@gmail.com

Abstract: Carbon Dioxide (CO_2) and Carbon Monoxide (CO) are the most important C-1 sources and taking intense interest in the field of academic research and industries because they provides the most interesting and valuable chemicals. In this consequences, we focused on development of the sustainable catalysts for the fixation of CO_2 and CO into the synthesis of value added chemicals. The fixation of CO by indirect route is also the intersesting and challenging path to synthesis the carbonyl compounds, in this regards the phenyl formate is the potetial candidated for the CO generation.

Keywords: Carbon dioxide , Catalysis , Sustainable synthesis.

1. Introduction

For the fixation CO_2 and CO the developments of active catalysts is highly demanding as well as challenging task. In this regards, the bi-functional Ionic Liquids (ILs) comprising hydroxyl and tertiary amine (DABCO) functional group ILs have been synthesized for CO_2 fixation.1-2 N-heterocyclic olefins (NHOs) as a newly emerging class of organocatalysts is investigated for the fixation of CO_2 through reactions with aziridines to form oxazolidinones and the N-formylation of amines with polymethylhydrosiloxane (PMHS) or 9-borabicyclo[3.3.1]nonane (9-BBN) as the reducing agents under mild conditions.[3] We also focused on the development of sustainable porous catalysts such as hybrid amine functionalized graphene oxide (APGO) for CO_2 Fixation.[4] While, for the fixation of CO, sustainable nanocatalysts based on supported KCC-1 and Pd/C have been utilized for the synthesis of value added chemicals.[5-6] Phenyl formate as CO source and Pd/C as a heterogeneous catalyst used for the synthesis of esters at mild reaction conditions. Various palladium based methodologies also developed for the carbonylation reactions to synthesis the amides, esters and heterocycles.

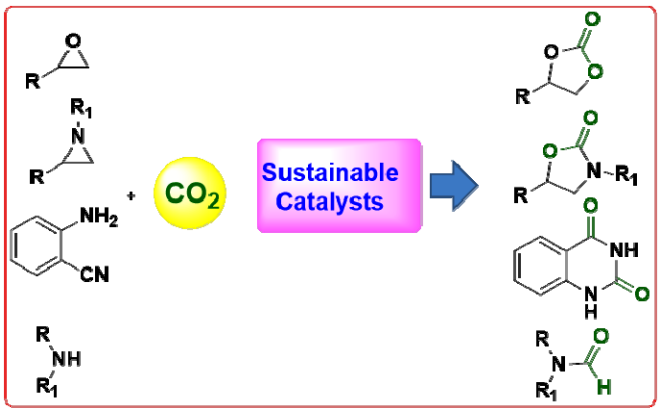

Figure 1. Fixation of carbon dioxide in to the value added chemicasl by using the sustainable catalysts.

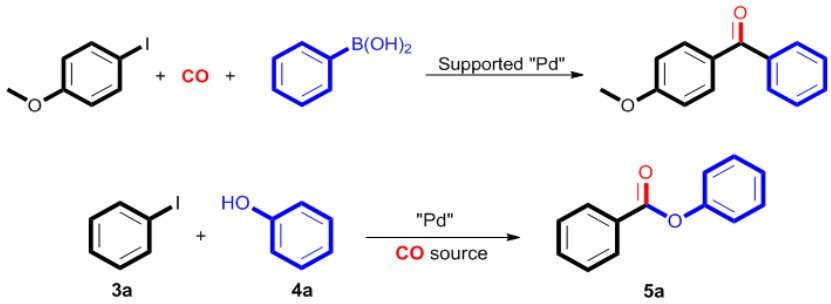

Figure 2. Fixation of carbon monoxide in to valuable chemicals.

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