Conversion of CO$_2$ to cyclic carbonates catalyzed by lanthanide salen complexes

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Abstract: Salen ligands have been widely applied in coordination chemistry of transition metals because of their excellent advantages such as ease of preparation, low cost and high tunability of the steric and electronic effects by modifications of the organic scaffold. In organolanthanide chemistry, lanthanide salen complexes are considered as efficient catalysts able to promote several chemical transformations, however, they have not yet been employed for the conversion of CO$_2$ to value added products. In this work, scandium and yttrium salen complexes were synthesized and used as homogeneous catalysts in the synthesis of value-added cyclic carbonate products by the coupling reaction of CO$_2$ and epoxides. This work shows the great potential of lanthanide salen complexes to catalyze the conversion of CO$_2$ into cyclic carbonates under mild reaction conditions and with a low catalyst loading.

Keywords: Conversion of CO$_2$; Lanthanide salen complexes; Homogeneous catalyst; Cyclic carbonates