

CeO₂-catalyzed synthesis of linear, cyclic and poly-carbonates
from CO₂ and alcohols using organic dehydrants

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Direct and catalytic synthesis of organic carbonates from CO₂ and alcohols is a promising technology as a simple and environmental-benign method. One of the conventional synthesis methods of organic carbonates is the reaction of alcohols with phosgene. However, the problems of this phosgene method are the usage of poisonous phosgene and large amount of salt byproduct for the neutralization. Our group found that CeO₂ is an effective catalyst for the selective synthesis of linear and cyclic carbonates from CO₂ and mono-alcohols or diols. Furthermore, it has been also found that the addition of 2-cyanopyridine enabled high yield of the target products and 2-cyanopyridine plays an important role on a dehydrant and a cocatalyst. Recently, we reported the direct catalytic polymerization of CO₂ and diols using CeO₂ catalyst and 2-cyanopyridine promotor, providing the alternating cooligomers (polycarbonatediols) in high diol-based yield (up to 99%) and selectivity (up to >99%).