

### The synthesis of poly(carbonate-co-ester) from CO<sub>2</sub> and their biological degradability

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CO<sub>2</sub> is the cheapest and most abundant raw material source of carbon. One possible utilization of CO<sub>2</sub> is in the production of polymeric materials that can be used in industry. A good example of such polymeric materials is poly(alkylene carbonate), which can be produced by the copolymerization of CO<sub>2</sub> with oxirane.

In this study, a highly efficient synthetic process of poly(carbonate-co-ester) from CO<sub>2</sub> with propylene oxide (PO) and ε-caprolactone (CL), δ-valerolactone (VL), or lactide (LA) using zinc glutarate as a catalyst is developed. CL and VL were used as comonomers as well as reaction media, so no additional organic solvent was used in the terpolymerization, resulting in no organic solvent waste. The terpolymers exhibited excellent enzymatic and biological degradability, suggesting their merit as candidate materials for environmentally friendly applications.