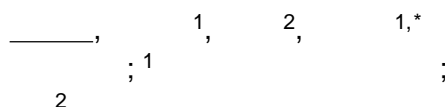


Copolymerization Of CO₂ and Styrene Oxide Using Double Metal Cyanide Catalyst Bearing Ethyl Lactate As Eco-friendly Complexing Agent



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Double metal cyanide catalysts are known to be extremely useful and active catalysts for the ring-opening polymerization of epoxides as well as copolymerization of CO₂ and epoxides. DMC was utilized for the copolymerization of CO₂ to styrene oxide (SO) by the introduction of ethyl lactate as complexing agent. Environmentally friendly and nontoxic lactate esters are effective CAs of DMC catalysts for the copolymerization between SO and CO₂. A series of DMC catalysts at different [Zn]/[Co] ratios, precipitation temperature and various lactate esters as complexing agents without co-complexing agents were synthesized and characterized through FT-IR, XPS, EA, TGA and XRD. Ethyl lactate as a complexing agent is the most active for copolymerization among lactate esters due to suitable polarity and steric effect. Polycarbonates with CO₂ incorporation of 83 %, a structure of nearly alternating SO and CO₂ and a molecular weight (M_n) of 14.3 kg/mol were prepared at moderate reaction conditions like 4 h, 50 °C, cat. 3 mg.