

Dimeric Aluminum Compounds with Furfuryl or Thiophenemethyl-modified Bidentate or Tridentate Ligands: Synthesis, Structures, and Use in Cycloaddition of CO₂ to Epoxides

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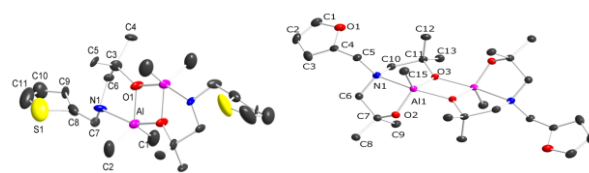
Efficient capture and utilization of CO₂ was an important environmental and chemical research topic. The development of chemical methods for activating and converting CO₂ to methanol, formic acid, cyclic carbonate, and urea has received recent attention. Among them, cyclic carbonates made from CO₂ and epoxides have been used as polar aprotic solvent, electrolytes for secondary batteries, monomers for polymers, and pharmaceutical intermediate.

Various catalytic systems have been reported for the coupling reaction of CO₂ and epoxides [1]. Typical examples are homogeneous organometallic compounds based on Al, Co, Cr, Cu, Fe, Ni, and so on. Many examples of aluminum complexes as catalysts for the cycloaddition reaction of CO₂ to epoxides have been reported in the literature [2-9].

Until now, much of the research focused on aluminum catalysts for the synthesis of cyclic carbonate has been directed toward the modification of aromatic chelating ligands such as tetradentate salen-based ligands [3-10], tetradentate tris(phenolate)amine ligands [11,12], tetradentate porphyrin-based ligands [13,14], and bidentate phenolic ligands [15,16]. To our best knowledge, dimeric aluminum catalysts chelated by bidentate or tridentate ligands tethering heteroaromatic substituents have never been used as catalysts for cyclic carbonate.

In this symposium, we will report the synthesis and characterization of aluminum

complexes containing the heteroaromatic substituents such as furfuryl or thiophenemethyl and their use as catalysts for cycloaddition reaction of CO₂ to epoxides.



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