Well-controlled, zinc-catalyzed synthesis of low molecular weight oligolactides by ring opening reaction.

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Streszczenie

The paper describes a comparative study on a precise synthesis of short oligomers by ring opening polymerization of l-lactide (l-LA) with ZnL_2 (L = aminophenolate) or $Sn(Oct)_2$ (Oct = bis(2-ethylhexanoate)) as initiators and propargyl alcohol as a co-initiator. The oligolactide synthesis is much more efficacious in the presence of zinc initiator than in the case of tin compound. Moreover, under an appropriate molar ratio of zinc complex/LA/alcohol, the catalytic reaction can yield either oligomers or alkyl lactyllactates or alkyl lactates. DFT calculations concerning the 1:1 or 1:2 complexes of methyl lactyllactate with methanol reveals a selectivity mechanism of zinc complex towards one of these processes. As for the tin compound, it appears not selective towards alcoholysis and hence oligolactide must always be accompanied by the formation of alkyl lactyllactate. Hence, when a low-molecular-weight oligomer constitutes a synthetic priority, quenching the reaction with hexanes or heptane is much more effective.

Słowa kluczowe

lactide, Oligolactide, Zinc compounds, Sn(Oct)2, ROP, DFT calculation

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