Struktura i reaktywność związków alkoksy-cynkowych jako inicjatorów/katalizatorów polimeryzacji estrów cyklicznych = Structure and reactivity of alkoxy-zinc compounds as initiators/catalysts in the polymerization of cyclic esters.

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Streszczenie

This review focuses on advances in the synthesis and structural chemistry of zinc alkoxide compounds for use in the catalytic ring-opening polymerization (ROP) of lactides (LAs). This route was used for the preparation of lactic acid based polymers – referred to as polylactides (PLAs). These polyesters have ecofriendly properties such as renewability, biocompatibility, and biodegradability, and are therefore among the most promising green polymers. PLAs have found numerous specialty applications in the biomedical industry, such as biodegradable screws and sutures, scaffolds for tissue engineering, matrices for controlled drug delivery systems, and environmentally friendly food-packaging materials. In industry, PLAs were synthesized by bulk polymerization of LA using tin(II) alkoxides synthesized in situ from tin(II) 2-ethylhexanoate. The toxicity associated with most tin compounds is a considerable drawback in the case of biomedical applications. There has therefore been much research devoted to finding welldefined complexes of high activity containing biologically benign metals. In this context, zinc alkoxides are very attractive non-toxic initiators for the synthesis of polymers that could be used in medical and environmental fields. The most broadly applied representations of zinc initiators for ROP of LA are zinc carboxylates, β-diketonates, β-diketiminates, phenolates and bisphenolates, trispyrazolyl- and trisindazolyl-borates, heteroscorpionates, aminophenolates, Schiff base, and iminealkoxylates. The mentioned above initiators were classified and analyzed in the context of their coordination chemistry and revealed catalytic activity in the ROP of LA. The review contains only pioneering/groundbreaking works that allowed for setting new research paths for each of the described groups of initiators, showing how this theme has changed over the last several decades.

Słowa kluczowe

zinc alkoxides, polylactide, polymerization, lactide, lactic acid

związki alkoksylowe cynku, polilaktyd, polimeryzacja, laktyd, kwas mlekowy