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Badanie nad procesami utleniania biopoliestrów alifatycznych i ich syntetycznych analogów

Praca doktorska
wykonana pod kierunkiem
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w Centrum Materiałów Polimerowych
i Węglowych Polskiej Akademii Nauk

Zabrze 2013

The aim of the studies described in this thesis was to synthesize a new functional 3-hydroxybutyrate oligomers by oxidation of low molar mass PHB with crotonate end group. The stability of PHA in oxidative conditions was also studied.

Oligoesters with 3-methyloxirane-2-carboxylate end group was synthesized by oxidation of PHB crotonate using m-chloroperbenzoic acid or oxygen in presence of organic peroxide, as oxidizing agent. Reactivity of such functionalized PHB was confirmed in model reaction with primary amine and alcohol.

Ozonolysis of PHB crotonate end group with subsequent decomposition in reductive or oxidative conditions results in PHB glyoxylate or monooxalate, respectively. Moreover, it was shown that obtained PHB glyoxylate may be applied in synthesis new drug delivery systems.

Study of PHA stability in oxidative condition shown that only when oxygen/ozone mixture was used as oxidation agent, at temperature above 100°C significant decrease of molar mass was observed. Mixture of oligoesters (oligo(3-hydroxybutyrate) and oligo(3-hydroxybutyrate-co-β-malate) with different composition) possessing various end groups deriving from following acids: 3-hydroxybutyric, oxalic, malonic, lactic and malic was obtained as a result of such oxidative degradation. It was proved that oligo(3-hydroxybutyrate-co-β-malate) was formed *via* unexpected partial oxidation of 3-hydroxybutyrate unit methyl group into carboxylic ones.