

Polymerization Case with Hydroxybenzoxazines: What Is the Role of the Hydroxy Group, Does It Act as a Self-Catalyst or a Modifier of the Polymer Structure?

Autorzy

Magdalena Stępień
Edyta Nizioł
Małgorzata Gazińska
Aleksandra Marszałek-
Harych
Wiktor Zierkiewicz
Łukasz John
Patrycja Wytrych
Jolanta Ejfler

Rok wydania

2025

Czasopismo

Macromolecules

Numer woluminu

58

Strony

473-487

DOI

10.1021/acs.macromol.4c01664

Kolekcja

Naukowa

Język

Angielski

Streszczenie

A monofunctional benzoxazine with an *ortho*-positioned hydroxy group was designed in an attempt to obtain low-curing monomers impelled by intra- and intermolecular hydrogen bonds. A set of hydroxybenzoxazines (OHBx^{R}) was synthesized with different substituents (R) on the nitrogen atom of the heterocyclic ring. The structure in the solid state indicates dimeric compounds in which benzoxazine molecules are bonded together by intermolecular hydrogen bonds between the hydroxyl functional and nitrogen atoms. All hydroxybenzoxazines showed lower curing temperatures in comparison with adequate benzoxazine monomers without hydroxy functionalization ($\text{OHBx}^{\text{R}} < \text{tBuBx}^{\text{R}}$). The ring-opening polymerization for hydroxybenzoxazines proceeds via different pathways stimulated by hydrogen bonds, giving rise to a new, unknown hydroxy-acetal type of polybenzoxazine. The crucial new stage in the modified structure of the polymer chain involves proton transfer from the hydroxy group to the activated oxygen atom from the open oxazine ring.

Słowa kluczowe

Aromatic compounds, Molecular structure, Monomers,
Noncovalent interactions, Ring-opening polymerization

Adres publiczny

<http://dx.doi.org/10.1021/acs.macromol.4c01664>

Strona internetowa wydawcy

<https://www.acs.org/content/acs/en.html>

Artykuł

Plik został wygenerowany dnia 2026-10-03 06:56:29

Adres w repozytorium <https://old.chem.uni.wroc.pl/pl/repozytorium/RhFP48m>.