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Abstract

Synthesis of poly(ε-caprolactone)-grafted guar gum by surface-initiated ringopeningpolymerization

Mohammed Lahcinia

Laboratory of Organometallic and Macromolecular Chemistry-Composites Materials, Faculty of Sciences and Technologies, Cadi Ayyad University, Avenue Abdelkrim
Elkhattabi, B.P. 549, 40000, Marrakech, Morocco

Abstract:

This study reports the grafting of poly(ε-caprolactone) (PCL) on guar gum (GG) by in-situ ring-opening polymerizationusing tetra(phenylethynyl)tin (Sn(C≡CPh)4) as catalyst. The hydroxyl groups of guar gum act asinitiators for ε-caprolactone ring-opening polymerization and the resulting poly(ε-caprolactone) binds covalentlyto the polysaccharide. The highest stability of Sn(C≡CPh)4 allows the reaction in open-air, thereby reducing thecost of the synthesis and provides polymers with high molar mass. Fourier transform infrared (FTIR) and thelong-term stability of the suspension PCL-g-GG in dichloromethane confirmed the effectiveness of grafting of PCLinto GG. The size exclusion chromatography (SEC) results show that the molar masse of grafted PCL could bemodulated by varying the amount of guar gum. From thermogravimetric analysis and differential scanningcalorimetry results the thermal stability of PCL-g-GG is greatly improved with different content of guar gum, alsothe melting temperature and crystallinity increased by increasing the GG content. The scanning electron microscopy(SEM) analyses showed the good adhesion between GG and PCL

with 5% of GG contents. It was alsorevealed by contact angle measurements that the grafting of PCL to GG leads to a decrease of hydrophobicity ofPCL. The micro-indentation hardness properties of the prepared PCL-g-GG were significantly improved, ascompared to neat PCL.

Biography:

Mohammed Lahcinia, Laboratory of Organometallic and Macromolecular Chemistry-Composites Materials, Faculty of Sciences and Technologies, Cadi Ayyad University, Avenue Abdelkrim. is Submitted his abstract on the conference on Future Scope for Biopolymers and Bioplastics; May 04-05, 2020; Vienna, Austria

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