

عنوان مقاله:

Surface-initiated Atom Transfer Radical Polymerization and Solution Intercalation Methods for Preparation of Cellulose-G-PS-G-PAN/MMT Bionanocomposite

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خلاصه مقاله:

Cellulose was modified by polystyrene (PS) and polyacrylonitrile (PAN) via free radical and living radical polymerization, and then cellulose was used as the matrix in the preparation of polymer/clay nanocomposite, through a solution intercalation method. For this purpose, first, the graft polymerization of styrene (St) onto cellulose fibers was performed by using suspension polymerization and the free-radical polymerization technique in the presence of potassium persulfate (PPS). Second, the synthesized cellulose-graft-polystyrene was brominated by N-bromosuccinimide (NBS) to obtain polymers with bromine a group. Third, the brominated cellulose fibers were used as macroinitiators in the atom transfer radical polymerization (ATRP) of acrylonitrile (AN) in the presence of CuCl / ۲, ۲'-bipyridine (Bpy) catalyst system in THF solvent at ۹۰ °C to prepare the cellulose-graft-polystyrene-graft-polyacrylonitrile. Forth, for preparing the modified clay, Na-MMT was mixed with hexadecyl trimethyl ammonium chloride salt. Finally, cellulose-graft-polystyrene-graft-polyacrylonitrile/organoclay bionanocomposite was prepared in CCl₄ by a solution intercalation method. Then, the structure of the obtained terpolymer was investigated by FT-IR, DSC, TGA, XRD, and SEM techniques. Moreover, the structure of the bionanocomposite was probed by XRD, SEM, and TEM images.

کلمات کلیدی:

Bionanocomposite, Cellulose, Styrene, Atom Transfer Radical Polymerization, Modified Clay

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