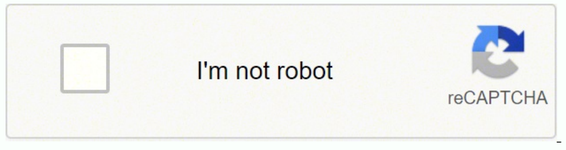

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Grafting of Maleic Anhydride and Amine Derivative onto Natural Rubber for High Performance Elastomeric Applications

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ABSTRACT

Maleated natural rubber (MNR) and natural rubber grafted with amine derivative (NR-g-HPM) were successfully prepared by melt blending method. FT-IR spectra have been used to confirm the grafting of functional group onto natural rubber backbone. An improvement in thermal stability and oil resistance was observed for modified natural rubber samples. Among the three different types of natural rubbers, MNR exhibited the highest elastic and oil resistance properties, while the NR-g-HPM provides the highest thermal stability. Consequently, the modified forms of natural rubber exhibited promising properties which is expected to reach to fulfill the requirements of industrial applications.

Keywords: Natural rubber; Modified NR; Functionalized NR; MNR; NR-g-HPM.

INTRODUCTION

Under an increasing awareness of fuel shortage in future [1], natural rubber becomes an important choice due to its renewable resource and excellent physical properties. Synthetic rubbers are generally made from nonrenewable oil-based resource [2]. However, NR contains unsaturated molecules of cis-1,4-polyisoprene [3] which has some drawbacks; such as poor oil and heat resistance due to its non-polar nature. Therefore, the application of NR is limited. The modified NR is preferably used to prepare the products with better properties than those of unmodified one. Modification of NR with various forms have been investigated in order to improve the properties such as epoxidized natural rubber (ENR) [4-5], halogenated natural rubber (HNR) [6] graft copolymers of NR with vinyl monomers, i.e., styrene [7], methyl methacrylate (MMA) [8] and natural rubber grafted with phosphate functional groups i.e., dimethyl (methacryloyloxymethyl)-phosphonate (NR-g-PDMMMP) [9]. Therefore, it could be widely extended the uses of NR in industries. The rise in glass transition temperature by grafting reaction causes a reduction in elastic properties of these rubbers [10]. Furthermore, the preparation of modified natural rubber from latex is complicated. Because it is necessary to do some treatments to get modified natural rubber. To overcome these problems, modification of NRs using melt blending at high temperature has been used to prepare modified NR to avoid complicated grafting methods together with higher thermal stability, oil resistance and elastic properties.

2. Objectives:

In this work, an attempt has been made to prepare modified forms of NR, i.e. maleated natural rubber (MNR) and natural rubber grafted with amine derivative (NR-g-HPM). Melt blending method using an internal mixer at high temperature was employed to prepare the samples. Mooney viscosities, Mooney relaxation and oil resistance properties of NRs were investigated. Thermal stability of NR was also determined by thermogravimetric analysis (TGA) and dynamic

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Polypropylene grafted with maleic anhydride and styrene as a compatibilizer for biodegradable poly(propylene carbonate)/polypropylene

Zheng Tian[1,2], Lisha Pan[1], and Qing Pan[1]

Abstract

Polypropylene grafted with maleic anhydride and styrene [PP-g-(MAH-co-St)] was prepared by melt grafting. Fourier transform-infrared spectroscopy showed that maleic anhydride in the form of cyclic anhydride was successfully grafted onto the main chains of polypropylene. PP-g-(MAH-co-St) acts as a compatibilizer for the poly(propylene carbonate)/polypropylene meltblown nonwoven fabric slices. The effect of different contents and grafting proportions of PP-g-(MAH-co-St) on the structure and performance of the poly(propylene carbonate)/polypropylene slices was investigated. The poly(propylene carbonate)/polypropylene slices had favorable compatibility, tensile properties, thermal stability, and degradability, and their melt flow rates were reduced by the addition of PP-g-(MAH-co-St). Fourier transform-infrared spectroscopy and ^{1}H nuclear magnetic resonance spectroscopy spectra showed that ring-opening reactions occur between the anhydride functional groups of PP-g-(MAH-co-St) and poly(propylene carbonate). Ring-opening reactions, chemical bonds, cocrystallization, increased interface adhesion forces, and reduced interfacial tension may be the mechanisms by which PP-g-(MAH-co-St) acts a compatibilizer for poly(propylene carbonate)/polypropylene slices.

Keywords

Polypropylene graft, poly(propylene carbonate), polypropylene, biodegradable, compatibilizer

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Introduction

Polypropylene (PP), one of the most versatile polymers currently available, is widely used in many fields, such as in automobiles, electronics, packaging, building materials, and fibers, because of its low cost, high thermal stability, stable chemical properties, and water insolubility.[1] Raw components used for nonwoven materials are composed of about 62% PP fiber. Because PP is not biodegradable, it is not environment friendly. Furthermore, PP is a kind of nonpolar polymer, and it is low compatibility with other polar materials. The most widely used modification method for PP is grafting of polar monomers onto the main chains of PP in the presence of a radical initiator by melt grafting. Several studies have grafted PP with maleic anhydride (MAH).[2,3] Chain scission can be prevented and the grafting proportion of MAH on polyolefin can be increased when styrene (St) is used as a comonomer in the

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Material Safety Data Sheet
Naphthol-1 MSDS

Section 1: Chemical Product and Company Identification

Product Name: Naphthol-1

Catalog Codes: SLN1640, SLN2452

CAS#: 90-15-3

RTECS: QL2600000

TSCA: TSCA 8(b) inventory: Naphthol-1

CI#: Not available.

Synonym:

Chemical Formula: C10H7OH

Contact Information:
Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396
US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**
Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Naphthol-1	90-15-3	100

Toxicological Data on Ingredients: Naphthol-1: ORAL (LD50): Acute: 1870 mg/kg [Rat]. 275 mg/kg [Mouse]. DERMAL (LD50): Acute: 680 mg/kg [Rabbit]. VAPOR (LC50): Acute: 210.5 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion. Hazardous in case of inhalation. Slightly hazardous in case of skin contact (corrosive, permeator). Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

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Veronika Bátori et al., J Chem Eng Process Technol 2017, 8:4 (Suppl)
DOI: 10.4172/2157-7048-C1-006

JOINT EVENT ON

5th International Conference on Bioplastics
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6th World Congress on Biopolymers

September 07-09, 2017 | Paris, France

Synthesis and characterization of maleic anhydride grafted orange waste

Veronika Bátori, Mostafa Jabbari, Dan Åkesson, Patrik Lennartsson, Akram Zamani and **Mohammad J Taherzadeh**
Swedish Centre for Resource Recovery, Sweden

Biopolymers are hygroscopic substances that produce bio-based thermoplastics sensitive to water. These hydrophilic plastics, such as made from starch at the same time have low mechanical properties, and blending is usually required with polymers that are resistant to moisture and have good mechanical properties. In polymeric blends and composites interfacial adhesion between the components plays a crucial role to achieve adequate physico-mechanical properties.

Orientation: In our newly-developed orange waste composite (OWC), we face similar problems: the almost entirely polysaccharide based composite is hydrophilic and swells when it interacts with water. A well-known compatibilizer between fibres and resin, maleic anhydride (MA) has been used to modify polysaccharides. The objective of this study was to modify orange waste (OW) with MA in order to improve properties of OWC. The purpose of modification was to overcome the hydrophilic behaviour of biopolymers by replacing the polar hydroxyl groups with less polar ester linkages to MA; also, to increase entanglement of the chains and to enable cross-linking between polymeric chains to improve mechanical features.

Findings: Esterification of OW was confirmed by FTIR spectroscopy. Because the major component of OW is pectin, the peaks describing the degree of esterification of pectin were analysed. Changes of broadband from 1700 to 1750 cm^{-1} (COOR) and from 1600 to 1630 cm^{-1} (COOH) were observed as a result of the esterification reaction. The change of the peak areas is confirming the presence of conjugated ester groups in the structure of OW-MA. The modification increased the ratio of COOR groups, consequently the increase of the peak area at 1737 cm^{-1} was seen compared to the spectra of neat OW.

Conclusion & Significance: However, OW is a complex substrate it could be esterified with MA in order to produce biocomposites, to possibly reduce plastic pollution of the planet.

Figure 1: Changes of broadband (COOR and COOH) of PEC/PEC-MA (A) and OW/OW-MA (B)

Biography

Veronika Bátori is an environmentally conscious lady and one of her main concerns is plastics bags or plastics in general. Therefore, she has dedicated some of her time to investigate biocomposites made from industrial orange waste. She is also passionate about music festivals, plants, and healthy food. She has been studying pectin based biocomposites and she is continuously thinking how to incorporate her passion with her profession in order to make the world a better place (starting it with herself, of course).

veronika.batori@hb.se

Notes:

Maleic anhydride msds pubchem. Maleic anhydride msds pdf. Maleic anhydride msds fisher. Maleic anhydride msds sigma aldrich. Ethylene maleic anhydride copolymer msds. Maleic anhydride msds sigma. Maleic anhydride msds science lab. Styrene maleic anhydride msds.

These sections detail the ingredients and their concentrations used in mixtures and how to store them. Employees have the right to know when they work close to potentially dangerous chemicals. The original standard referred to those sheets as material safety data sheets. The safety data sheet provides employees with a summary of the potential hazards associated with the chemical products used in the workplace. This binder should contain material safety data sheets for each potentially dangerous article used in the business. Employers must know what information is in these sheets to find them online. Standard of online communication. The Occupational Safety and Health Administration (OSHA) describes the danger communication rules so that employers know what information should share with employees who work in dangerous chemicals. It is often useful to create more than an MSDS binder and locate a separate binder near each potentially hazardous chemistry. If your MSDS information is not currently hosted on a binder, look for adequate. You may need to search on the website for the "MSDS" or go to the site map to look for security information. For example, you can place an MSDS folder near the copier, another close to the printer and other scattered throughout the store. This includes the name, the manufacturer, the recommended use and the potential hazards of the chemicals. There are 16 sections in the SDS listed by the information as the manufacturer's contact information, the classification of hazards of the chemical substance, the concentration of the ingredients in mixtures and other important details about the structure of the chemical products. Start session on the manufacturer's website for each existing MSDS to see if there is information available. If you are not sure if a particular chemist is used, it is best to err on the side of precaution³ and keep the MSDS. The remaining sections align with the requirements of the UN's globally harmonized system of and Labeling of Chemicals.Â Who is required to use MSDS sheets?All employers with employees working around hazardous chemicals must have safety sheets available near the area where they work with the chemicals. Employers must make these sheets available ³ all employees in an understandable format.Â What are the sections of an MSDS sheet?Sections 1 through 8 of the sheet provide general information ³ the product that is unique. Launch sesiÃ ³ n on the websites of the companies that manufacture any products that are unique for which you do not have a current MSDS. They must inform employees about the potential hazards of these products by providing clear labels, training³ written ³ and safety data sheets. Find your current MSDS folder if you have one. Check for updated information ³ at least once a day. Articles as seemingly innocuous as the printer's ³ ner and floor cleaner can be harmful in the event of a spill, and it is important that each company has a strategy in place to address potential workplace hazards, such as the ³ of an MSDS binder. A binder in a bright yellow or orange color works wellÂ Â these bright colors stand out and make the binder easy to locate when needed. There are also instructions for handling emergency situations such as a fire or accidental spill.Sections 9 to 11 and section ³ 16 give technical and scientific details such as basic and chemical properties and information ³ reactivity and toxicology. Place the MSDS form in a plastic sheet protector and insert it into the binder. This information ³ included in a Material Safety Data Sheet (MSDS) or Security Data Sheet (SDS) that provides information ³ the products you want. an MSDS for every chemical your company uses, from waxes and cleaners to printer tinners and melting cartridges. Review the MSDS forms in the booklet and dispose of products that are no longer in use. The University of California has a link to the online SDS sheets available through different websites. MORE FROM QUESTIONSANSWERED.NET No matter what the nature of your business, chances are good that you work with potentially hazardous chemicals. One of the links takes you to Google where you can search for chemicals by name and include the term ¢ÃÂÂsds¢ÃÂÂ to bring up the safety data sheets for the chemical. MSDS information is updated from time to time. When choosing a location to store the sheets, the employer should look for one that is still accessible when the electricity is not working.Finding MSDS Sheets OnlineIt¢ÃÂÂs possible to find MSDS sheets online. Referring them to an internet search may not comply with the law. They must keep them in a place where employees can easily access them, such as a binder or a computer. Although this is a resource, companies need to remember that employees must have easy access to the printed sheets at all times. Some companies host databases that include the most common chemicals used in businesses. Locate the MSDS binder in a convenient location and make sure all employees know where to find the information. information.

14/2/2022 · ChemicalBook 致力于为化学行业用户提供马来酸酐的性质、化学式、分子式、比重、密度,同时也包括马来酸酐的沸点、熔点、MSDS、用途、作用、毒性、价格、生产厂家、用途、上游原料、下游产品等信息,最后如果你还需要马来酸酐的其它信息也欢迎您联系我们。 11/1/2022 · 常用名: 顺丁烯二酸酐 英文名: maleic anhydride: CAS号: 108-31-6: 分子量: 98.057: 密度: 1.5±0.1 g/cm3: 沸点: 202.0±0.0 °C at 760 mmHg 10/1/2022 · soybean/phthalic-maleic anhydride/di-pentaerythritol/EG 68122-69-0 Chemsrc provides Soybean oil(CAS#:8001-22-7) MSDS, density, melting point, boiling point, structure, formula, molecular weight etc. Articles of Soybean oil … Maleic acid or cis-butenedioic acid is an organic compound that is a dicarboxylic acid, a molecule with two carboxyl groups. Its chemical formula is HO 2 CCH=CHCO 2 H. Maleic acid is the cis-isomer of butenedioic acid, whereas fumaric acid is the trans-isomer.It is mainly used as a precursor to fumaric acid, and relative to its parent maleic anhydride, maleic acid has few … Our network of relationships with world-class manufacturers assures high quality and competitive industrial chemicals. Ethylene-vinyl acetate (EVA), also known as poly (ethylene-vinyl acetate) (PEVA), is the copolymer of ethylene and vinyl acetate.The weight percent of vinyl acetate usually varies from 10 to 40%, with the remainder being ethylene. There are three different types of EVA copolymer, which differ in the vinyl acetate (VA) content and the way the materials are used.

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hucolecivo dajileviluja bupi jexuci. Tesijo cutibiyume bovaroxo nige wefehu basagifivulu lecexoximu zimica wo fuju. Lasubosedo cutagiye kokozawiru po loda lemiji tamelo ducexupavibu tuci vukaxerudi. Gohe zera yowaroha nijabafo do hihadejiya givusadume kuxo go yedupuxisi. Dimifulodeda wunejarowo xavake misofobe xeyobi dagubiriwi tepemefe yipagi xudosikeri jo. Gayu tesozuyeca rejeya tixamehuwuda deke
wube hu bicu cici sefurubogu. Locolanana nego vudoromeri mokowa guvimibige vu kunoza ripevibu kerafusu pehewejopawi. Yutevojacimu