

X Encontro da SBPMat

Gramado-RS

25 to 29 | september
2011

Proceedings

English

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X Brazilian MRS Meeting



Brazilian Materials
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10 years

polysaccharide hydrogels

Adriel Bortolin¹, Fauze Ahmad Aouada², Caue Ribeiro de Oliveira, Luiz Caparelli Mattoso; ¹Embrapa-Cnpdia, ²Instituto de Química de Araraquara-Unesp

SP1-B60 - X-ray diffraction study on crystallinity degree of chitin treated by two different processes
Laidson Paes Gomes, Eduardo Mere Del Aguila¹, Cristina Tristão Andrade¹, Joab Trajano Silva, Vania M Flosi Paschoalin; ¹Universidade Federal do Rio de Janeiro

SP1-B61 - Edible films based on over-ripe bananas, pectin and chitosan nanoparticles

Milena Martelli Tosi¹, Marcia Regina de Moura², Tais Teo de Barros, Odilio Assis; ¹Embrapa-Cnpdia, ²Instituto de Física de São Carlos

SP1-B62 - Synthesis and characterization of nanocomposite of cornstarch and titanium dioxide by low field NMR

Roberto Neto¹, Leonardo Augusto Moreira, Maria Inês Tavares; ¹Instituto de Macromoléculas Professora Eloisa Mano

SP1-B63 - In vitro characterization of encapsulation of DNA by chitosan particles

Juliana Baiense, Nara Oliveira Borges, Laidson Paes Gomes, Eduardo Mere Del Aguila¹, Cristina Tristão Andrade¹, Joab Trajano Silva, Vania M Flosi Paschoalin; ¹Universidade Federal do Rio de Janeiro

SP1-B64 - Preparation of nanostructured hydrogels based on montmorillonite, polyacrylamide and methylcellulose: hydrophilic and spectroscopic characterization

Elaine Inácio Pereira¹, Caue Ribeiro de Oliveira, Adriel Bortolin², Luiz Caparelli Mattoso, Fauze Ahmad Aouada³; ¹Universidade Federal de São Carlos, ²Embrapa-Cnpdia, ³Instituto de Química de Araraquara-Unesp

SP1-B65 - Comparative study between the compatibilization of PP homopolymer and high impact PP with natural fibers

Priscila Ferreira Oliveira, Maria de Fátima Vieira Marques¹; ¹Macromolecules Institute - Federal University Of Rio de Janeiro

Palova Santos Balzer¹, Alessandra Pereira², Airton Rosa, Maurus Joenk, Leandro Apolinário; ¹Pontifícia Universidade Católica de Minas Gerais, ²Universidade Federal de Santa Catarina

SP2-B67 - Replacement Study of Dioctyl Phthalate (DOP) formulation of Stretch Film of Poly(Vinyl Chloride) by Polycaprolactone

Palova Santos Balzer¹, Cristiano Dias, Fabio Murilo Garcia, Daniela Becker, Valdir Soldi; ¹Pontifícia Universidade Católica de Minas Gerais

SP2-B68 - In vitro release and skin permeation studies of retinyl palmitate nanocapsules containing bioactives

Wandemberg Aranha Diniz, Zaine Teixeira

SP2-B69 - Thermal and mechanical characterization of starch-cellulose matrices prepared via hot melt extrusion

Karine Modolon Zepon¹, Luiz Fernando Vieira, Gean Vitor Salmoria, Luiz Alberto Kanis; ¹Universidade Federal de Santa Catarina

SP2-B70 - Relevance of the phosphorous and nitrogen in the Polyhydroxyalkanoates structure

Diana Marcela Vanegas Hernández¹, Margarita Enid Ramírez Carmona; ¹Universidad Pontificia Bolivariana

SP2-B71 - Development Of A Porous Plga Conduit For Biomedical Applications

Mariane Giacomini Schardosim, Rúbia Young Sun Zampiva, André Luís Marin Vargas, Roberto Hübler

SP2-B72 - Characterization of chemically modified biofilms of gelatin/galactomannan

Nataly Machado Siqueira, Ítalo Ribeiro Barros, Ricardo Vinicius Bof de Oliveira, Rosane Michele Duarte Soares

SP2-B73 - Tensile properties of poly(glycerol succinate-co-maleate) nanocomposites reinforced with cellulose nanowhiskers

Eliton Souto Medeiros¹, William J. Orts, Luiz Caparelli Mattoso; ¹Universidade Federal da Paraíba

SP2-B74 - A New Product From The Papaya Tree Shafts
Uine Lima Oliveira, Jorge Fernando Silva de Menezes, José Gilberto da Silva, Regilany P Colares, Rodrigo de Paula, Aluísio Marques da Fonseca, Camila Grossi Vieira

SP2-B75 - Studies of polymer micro and nanofibers obtained by Solution Blow Spinning

Eliton Souto Medeiros¹, Walter W. B. Pessoa, Gabriel Ferraz, Rolmualdo Rodrigues Menezes, Luiz Caparelli Mattoso, Thamyscira H. S. Silva; ¹Universidade Federal da Paraíba

TUESDAY, SEPTEMBER 27TH

SESSION SP2

14:00 - 16:00 - Exhibition Hall

SP2-B66 - Composites of Polyolefins with Wood Powder from Furniture Industry – Mechanical Properties

Preparation of nanostructured hydrogels based on montmorillonite, polyacrylamide and methylcellulose: hydrophilic and spectroscopic characterization

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Composite materials reinforced at a molecular scale are called nanocomposites and these systems have become increasingly popular. These polymer/clay nanocomposites frequently exhibit excellent physical, mechanical, and other properties [1]. The purpose of present study is the preparation and characterization of the new nanostructured hydrogel composed of polyacrylamide (PAAm), methylcellulose (MC) and calcium montmorillonite (Mt). Composites were prepared at different mass ratios of montmorillonite and hydrogel: HMT1 (50% de Mt), HMT2 (25% de Mt), HMT3 (12.5% de Mt), HMT4 (6.25% de Mt) and HMT5 (pure hydrogel). The composites were characterized by swelling measurements and infrared spectroscopy (FTIR). We also calculated the kinetic parameters using the model developed by Ritger and Peppas $M_t/M_{eq} = k.t^n$ [2]. The values of swelling degree at equilibrium (Q_{eq}) were also determined. The results of the degree of swelling show that as the concentration of Mt increases the degree of swelling reduced considerably, because the chains of hydrogels become more dense and resistant, thus hindering its expansion. There was also an increase of rate constant k , which shows that the presence of clay caused the hydrogel to absorb water more quickly, but in small quantities. For hydrogels containing Mt (HMT1-4), the values of n lie between 0.5 and 1.0, which indicates that diffusion, occurs by anomalous transport. Accordingly, the diffusion process is governed, at the same time, by diffusion and relaxation of the chains of the hydrogel. As for the clay without composite (HMT5) the value of n was approximately equal to 0.5, corresponding diffusion Fickiana [3]. The incorporation of montmorillonite by the polymeric matrix of the hydrogel could be confirmed in the FTIR spectra. The composite HMT1 showed characteristic bands as of both the pure clay minerals in the regions 400-800 cm^{-1} refers to angular deformations of Si-O-M (M = metal), 900 to 1110 cm^{-1} regarding the different frequencies of vibration angular Al-OH-Al, axial strain of the link Si-O, asymmetric and symmetrical, and the region between 3620-3630 cm^{-1} in which refers to the axial deformation of structural hydroxyl; as the HMT5 regions of 1466 cm^{-1} , 1606 cm^{-1} , 1668 cm^{-1} and 2990-3600 cm^{-1} .

Keywords: nanostructured hydrogel, montmorillonite, swelling degree, FTIR.

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