X Encontro da SBPMat

Gramado-RS

25 to 29 | september 2011

SBPMat Brazil-MRS

Brazilian Materials Research Society

X Brazilian MRS Meeting

16 symposia with oral, poster and invited lecture presentations

Plenary lectures

Exhibits

Celebration of 10 years of Brazilian MRS

Conference Details and Registration

All attendees are encouraged to visit the conference website http://www.sbpmat.org.br/x-meeting for further and updated information such as registration, submission of abstracts, important links for traveling (visas, travel agencies) and hotel reservation.

Symposia

A) Magnetic and Superconducting Materials

B) Biodegradable Polymer Materials

C) Electronic Materials

D) Surface Engineering: Fabrication, Characterization, Properties and Applications of Protective Coatings and Modified Surfaces

E) Materials with Negative Properties

F) Nanostructured Functional Materials for Advanced Energy and Environmental Applications

G) Molecular Modeling Materials Science

H) Structure-property Relationship of Advanced Metallic Materials

I) Sol-gel Route to Prepare New Inorganic, Hybrid and Multifunctional Materials

J) Solidification of Metals and Alloys

K) Supramomolecular Organic Materials for Electronic, Photonics and Nanotechnology

L) Structure-Property Relationship of Ceramic Materials: Theoretical and Experimental Aspects

M) Advances and Applications of Electron Microscopy

Prospects for Materials Science with Synchrotron Radiation in Brazil

1st Brazilian Symposium in Friction Stir Welding and Processing

Graphene

Official Travel Agency: Liga Turismo

The agency provides excellent hosting, airline tickets (20% discount), Gramado-PoA airport shuttle options and sightseeing suggestions.

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10 years of excellence in the congregation of science and research in materials technology in Brazil

Contact

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Conference Chairs

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Important Dates

April, 5th - Registrations open
May, 30th - Submissions deadline
June, 13th - Acceptance

Support

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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 smal 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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