X Encontro da SBPMat

Gramado-RS

25 to 29 | september 2011

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

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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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ELECTROSPINNING OF BIODEGRADABLE NANOFIBERS AND NANOCOMPOSITE FIBERS: A REVIEW OF APPLICATIONS IN AGRICULTURE

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The development of a viable nanotechnology passes through the development of processing techniques, which can be used in desired production scales with reproducibility, especially in the cases where the final product is still in the nanoscale. This is the case of nanofibers, which can be used in nonwoven products, sensors and recently, those materials were showed as a possible system for coat different polymers. Several processes are used to produce polymer nanofibers, however, one of the most successfully is the electrospinning process, based in the Corona effect developed when a high voltage is applied to a polymer solution or melt. The fibers processed in this condition can easily attain diameters ranging from 10 to 500 nm and high surface area-to-volume ratio. The processing of nanocomposite solutions (polymer matrices with synthetic nanoparticles) using this technique shows an interesting physical confinement effect, since the loaded materials are of the same size order of the final fiber. In the case of reinforced materiais, as electrospinned fibers reinforced by nanocellulose whiskers, the results are especially interesting to understand the effect of nanoscale confinement in the final fiber property. However, this feature is also interesting to join the surface properties of the loaded nanoparticles with general applications of nanofibers. Then, some bactericidal nanoparticles, such as anatase TiO_2 or metallic Ag nanoparticles, may be tested. In our studies, several electrospinned nanofibers from different biodegradable polymers, as PVA and PLA, beside others, were produced, and some composites, as PVA/TiO_2 [1] and (PVA)/silver (Ag) [2], were prepared successfully in different conditions. The nanoparticles used as loadings were extracted or synthesized, showing effective sizes below 20 nm. The nanofibers were characterized by SEM, EDS, XRD and UV-Vis diffuse reflectance spectroscopy, showing that the technique can be used to produce fibers in diameters below 100 nm with good reproducibility. The antibacterial and catalytic activities of the nanofibers were investigated, showing some oxidative active against Rhodamine B dye (in the case of PVA/TiO_2 nanofibers) and good bactericidal activities against Staphylococcus aureus (87.8%) and Escherichia coli (85%) (for PVA/Ag nanofibers). An overview of applications for those materials was also showed, focusing in many possibilities to improve the competitiveness of agriculture.

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[1] Costa, R. G. F. ; Ribeiro, C. ; Mattoso, L. H. C. Journal of Nanoscience and Nanotechnology, v. 10, p. 5144-5152, 2010.
[2] Costa, R. G. F., Ribeiro, C. ; Mattoso, L.H.C. Science of Advanced Materials, v. 2, p. 157-162, 2010

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