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

N) Prospects for Materials Science with Synchrotron Radiation in Brazil

O) 1st Brazilian Symposium in Friction Stir Welding and Processing

P) 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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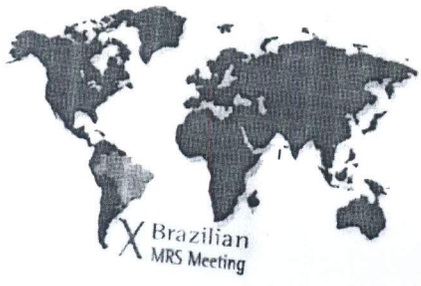

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10 years of excellence in the congregation of science and research in materials technology in Brazil

Contact

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Conference Chairs

Paulo F. P. Fichtner - UFRGS - RS
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Important Dates

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

Support

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Co/Mn-doped ZnO for photocatalytic degradation of Rhodamine B (RhB)

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Zinc oxide is a semiconductor that has been used as an effective photocatalyst for decolorization of organic dyes such as Rhodamine B [1] and methylene blue [2]. This material has a band gap of 3.2 eV (λ <387nm) and is much used in photocatalysis using UV radiation. The doping of ZnO enables the semiconductor has extended its absorption wavelengths of the UV to the visible region (λ> 400 nm) by modifying its band gap.

In this work, ZnO was doped with cobalt or manganese by precipitation method [3] in proportions of 0.25, 1.0 and 5.0 mol%. Zinc acetate, cobalt acetate and manganese acetate were used as precursors. The powders of ZnO doped with cobalt or manganese, were annealed at 500° C for 2h. The samples were characterized by XRD, SEM, FTIR, and UV spectroscopy in reflectance mode. The XRD results showed that for all compositions, only the ZnO phase (JCPDS 36-1451) was observed. No changes in lattice parameters (a=b=3.25, c=5.21) nor surface area and crystallite size was observed as function of doping ($S_{average\ Co}$=14m^2·g, $D_{XRD\ Co}$=33nm, $S_{average\ Mn}$=11m^2·g, $D_{XRD\ Mn}$ =32nm). The curves of FTIR show the presence of intense Zn-O bands, but no signal of Co-O or Mn-O was found. SEM images show the formation of pseudo-spherical particles and aggregate of various sizes.

Although no major structural changes of the particles, the absorption curve in UV-Vis spectroscopy showed that the energy gap decreased with the addition of dopant (3.55 to 3.20eV for the ZnO:Co^{2+} and 3.47 to 3:37 eV for the ZnO:Mn^{2+}).

Photocatalytic tests using ZnO:Co^{2+} and ZnO:Mn^{2+} were made in batch reactor equipped with mercury 3 lamps Philips 15W (UV-C, 254nm) with a 2.5 ppm RdB solution. The ZnO:Mn^{2+} samples showed degradation percentages between 78 and 96% and for the ZnO:Co^{2+} samples the percentage was 64 and 96%. This result is similar to the ZnO pure which showed a percentage of 96%.

Keywords: photocatalysis, ZnO, doped, band gap, rhodamine B

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[3] T. R. Giraldi, G. V. F. Santos, V. R. Mendonça, C. Ribeiro, I. T. Weber, Journal of Nanoscience and Nanotechnology **11** (2011) Number 4, 3635-3640.

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