XII Encontro da SBPMat

Campos do Jordão

2013

September 29 to October 03

XII Brazilian MRS Meeting




SBPMat
Brazil-MRS

Brazilian Materials
Research Society

Program Book

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1. Materiais. 2. Pesquisa em materiais. I. Sociedade Brasileira de Materiais – SBPMat. II. Título

SESSION OS11-5 (15:00 - 16:20) ROOM: 5

15:00 **L-O28**

Local Electrical Conductivity Of Isolated Carbon Nanotubes Electromagnetic Force Microscopy

Benjamin Fragneaud[1,2], Pedro Marin Bedê[2], Clara Muniz Almeida[2], Carlos Achete[3,2]; [1]Universidade Federal de Juiz de Fora, [2]Instituto Nacional de Metrologia, Qualidade e Tecnologia, [3]Universidade Federal do Rio de Janeiro

15:20 **L-O29**

Recent Advances In Glow Discharge Optical Spectrometry For The Characterisation Of Materials

Celia Olivero[1], Patrick Chapon[1], Philippe Ayasse[2]; [1]Horiba Jobin-Yvon, [2]Horiba Brazil

15:40 **L-O30**

Characterization Of The Electrochemical Kinetic In The Kaolin Bleaching Process

Andrés Mauricio Muñoz Garcia[1], Martin Eduardo Espitia[2], Juan Fernando Montoya[3], Moises Oswaldo Bustamante[4], Jorge Iván Usma Gutiérrez; [1]Instituto Tecnológico Metropolitano, [2]Corporación Universitaria Minuto de Dios, [3]Corporación Universitaria Lasallista, [4]Universidad Nacional de Colombia

THURSDAY , OCTOBER 03

SESSION OS13-5 (09:30 - 10:50) ROOM: 5

09:30 **L-O31**

Physico-Chemical Anisotropic Study Of Kaolin Minerals Surfaces From Colombian Using Afm Technique

Andrés Mauricio Muñoz Garcia[1], Martin Eduardo Espitia[2], Juan Fernando Montoya[3], Moises Oswaldo Bustamante[4], Jorge Iván Usma Gutiérrez; [1]Instituto Tecnológico Metropolitano, [2]Corporación Universitaria Minuto de Dios, [3]Corporación Universitaria Lasallista, [4]Universidad Nacional de Colombia

09:50 **L-O32**

Surface Study By Xps Of Functionalized Charcoal Compounds and Humic Acids From Anthropogenic Amazonian Dark Earh

Joyce Rodrigues Araujo[1], Braulio Soares Archanjo[1], Etelvino Henrique Novotny[2], Carlos Achete[1]; [1]Instituto Nacional de Metrologia, Qualidade e Tecnologia, [2]Embrapa Solos

10:10 **L-O33**

Influence Of Feed Speed and Granulometry In The Process Of Sanding Of The Wood Corymbia Citriodora.

Demétrio Zacarias[1], Manoel Cléber de Sampaio Alves[1], Paulo Roberto Gomes Alves[1]; [1]Faculdade de Engenharia de Guaratinguetá - Unesp

10:30 **L-O34**

Characterization Of Biological Surfaces With Water-Repellency and Self-Cleaning Properties

Hernán Espinoza Riera[1], Helen Mota, Marcela David Carvalho[2], Antônio Valadão Cardoso[3,1]; [1]Centro de Bioengemharia de Espécies Invasoras de Hidrelétricas, [2]Companhia Energética de Minas Gerais, [3]Universidade do Estado de Minas Gerais

POSTER SESSION

MONDAY , SEPTEMBER 30

SESSION PS1 (16:40 - 18:00) ROOM: Poster Session

L-P1 **Study Of Graphitization Of Diamond Coated And Uncoated**

Stênio Cavalier Cabral[1,2], Luciano José Oliveira, Ana Lucia Diegues Skury, Marcello Filgueira; [1]Universidade Estadual do Norte Fluminense Darcy Ribeiro, [2]Universidade Federal dos Vales do Jequitinhonha e Mucuri

L-P2 **Electrochemical and Nanomechanical Properties Of Zrn Coated Niti Shape Memory Alloy After Plasma Nitriding**

Rodrigo Leonardo de Oliveira Basso[1], Juliane Carla Bernardi[2], Fernando Silvio Ramone[3], Almir Spinelli[3], Carlos Alejandro Figueroa[4]; [1]Universidade Federal da Integração Latino-Americana, [2]Universidade Federal do Abc, [3]Universidade Federal de Santa Catarina, [4]Universidade de Caxias do Sul

L-P3 **Tribological Behavior Of Ti-6Al-4V Alloy Submitted To High Temperature Nitrogen Plasma Based Ion Implantation**

Cibele Fernandes[1,2], Aline Capella de Oliveira[3,1], Felipe de Campos Carreri[1], Rogério M Oliveira[1], Mario Ueda[1]; [1]Instituto Nacional de Pesquisas Espaciais, [2]Faculdade de Tecnologia de São José dos Campos, [3]Instituto de Estudos Avançados

L-P4 **Analysis Of Surface Degradation Pp and Hdpe Banana Fiber By Scanning Electron Microscopy (Sem)**

Camila Loricchio Veiga[1], Paula Hashimoto[1], Rosinei Batista Ribeiro[1,2], Jorge Luis Rosa[3], Nelson Tavares Matias[1,2]; [1]Faculdades Integradas Teresa D´ávila, [2]Universidade do Estado do Rio de Janeiro, [3]Universidade de São Paulo

L-P5 **Influence Of The Tic Coating On The Diamond In Improving The Wear Resistance Of Fe-Diamond Composites**

Stênio Cavalier Cabral[1,2], Luciano José Oliveira[1], Ana Lucia Diegues Skury[1], Marcello Filgueira[1]; [1]Universidade Estadual do Norte Fluminense Darcy Ribeiro, [2]Universidade Federal dos Vales do Jequitinhonha e Mucuri

Surface study by XPS of functionalized charcoal compounds and humic acids from anthropogenic Amazonian Dark Earh

J.R. Araujo[1], B.S. Archanjo[1], E.H. Novotny[2], A.M. Silva[1], C.A. Achete[1]

[1]*Instituto Nacional de Metrologia, Qualidade e Tecnologia, Divisão de Materiais, RJ, Brazil*
[2]*Embrapa Solos, RJ, Brazil*
e-mail: jraraujo@inmetro.gov.br

Advanced spectroscopy techniques, such as X-ray photoelectron spectroscopy (XPS) can be used in order to verify the existence of particular chemical groups in the highly fertile anthropogenic soil found in Amazonian region, known as "Terra Preta de Índios" (TPI) or Amazonian Dark Earth [1]. However, this high fertility and resilience of these special soils are not explained only by the high content of chemically inert pirogenic C, but the natural aging of this C generates reactive carboxyl functional groups attached directly to the recalcitrant polycondensed aromatic backbone [2]. In this context, the determination of surface aryl-carboxyl groups is a key-point to verify the effectively of the proposals to reproduce the peculiar organic matter found in TPI, and XPS comes as a powerful tool. For this, the humic acids fraction (i.e.: the alkaline soluble soil organic matter that precipitate at low pH) of a typical TPI was compared to synthetic humic acids and fulvic acids (i.e.: the alkaline fraction that remain in solution after the pH drop) obtained by chemical oxidation, with sodium hypochlorite, of activated charcoal. The similarity between the spectra indicated the success in the synthesis of an organic amendment similar to the peculiar soil organic matter (SOM) of TPI and that the obtained products were polycondensed aromatic structures with carboxyl groups: a soil amendment that can contribute to soil fertility and to its sustainable use. All these findings drive us step-by-step to the ending goal of producing synthetic TPI's organic matter improving soil usage, with implications in agriculture and climate change.

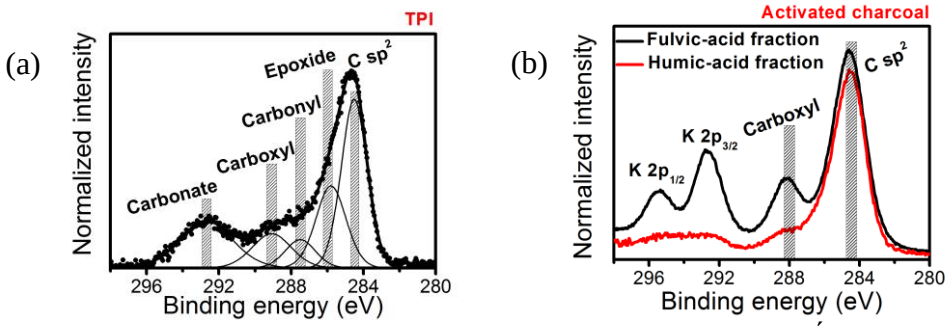

Figure 1: Molecular identification of carbon in (a) "Terra Preta de Índio" (TPI) and (b) activated charcoal fractions using X-ray photoelectron spectroscopy (XPS).

References:

[1] A. Jorio, J. Ribeiro-Soares , L. Cançado, C.A. Achete, *et al.*, Microscopy and spectroscopy analysis of carbon nanostructures in highly fertile Amazonian anthrosoils, Soil & Tillage Research 122 (2012) 61-66.

[2] E. H. Novotny, M. H. B. Hayes, B. E. Madari, *et al.*, Lessons from the *Terra Preta de Índios* of the Amazon region for the utilization of charcoal for soil amendment, J. Braz. Chem. Soc. 20 (2009) 1003-1010.