

Symposium B

POSTER SESSION PB1 - MONDAY, OCTOBER 9

B506 - UNSUPPORTED AND ALUMINA-SUPPORTED LANTHANUM OXIDE FOR STEAM REFORMING

Roberto Carlos Bittencourt (CENPES), Antonio Eduardo Martinelli (UFRN), Dulce Araújo Melo (UFRN), Marcus Freitas Melo (UFRN), Anne Garrido Pedrosa (UFRN) and Daniele Henrique Martinelli (UFRN)

In the present study, LaNiO₃ perovskite was synthesized by the Pechini method. The material was heat-treated at 300 °C for 2h and calcined at 800 °C for 4h. The resulting powders were characterized by TGA, BET and particle size measurements, IR, SEM and XRD. TGA revealed that the decomposition of the material took place in more than three stages and stabilized at ~ 750 °C. X ray diffraction confirmed that a perovskite structure was obtained upon heat-treating of the supported material at 300 °C and further calcination. SEM images revealed higher porosity of the unsupported material.

B507 - TiO₂ COLLOIDAL NANOCRYSTALS SYNTHESIZED BY SOLVOTHERMAL METHOD

José Arana Varela (LIEC/CMDMC/IQ/UNESP), Elson Longo (LIEC/CMDMC/IQ/UNESP), Giovanni Pimenta Mambrini (LIEC/CMDMC/DQ/UFSCar) and Edson Roberto Leite (LIEC/CMDMC/DQ/UFSCar)

It was realized a systematic study for the development of a new solvothermal methodology, which allows the synthesis of titanium oxide nanoparticles, with narrow size distribution and low aggregation. The powders were characterized by X-ray diffraction, Raman spectroscopy, scanning electron microscopy and transmission electron microscopy.

B510 - EFFECT OF THE EMULSION COMPOSITION ON THE POROSITY OF ZIRCONIA FOAMS PREPARED BY THE SOL-EMULSION-GEL METHOD

Sandra Helena Pulcinelli (Unesp - Araraquara), Eduardo Pena dos Santos (Unesp - Araraquara), Celso Valentim Santilli (Unesp - Araraquara) and Marinalva Aparecida Alves (Unesp - Araraquara)

Crack free, low density and high porous monolithic foams presenting monomodal pores size distribution have been obtained from the sol-emulsion-gel method. The influence of the surfactant concentration on the foams porosity is presented.

B528 - STRUCTURAL CHARACTERIZATION OF 0.5 Pb(Mg_{1/3}Nb_{2/3}O₃)-0.5 Ba_xPb_(1-x)TiO₃ POWDERS

Alberto Adriano Cavalheiro (IBB-UNESP), Thayz Cristina Boni (IQ-UNESP), Juliana Catarina Bruno (IBB-UNESP) and Maria Aparecida Zaghete (IQ-UNESP)

PMN-50PT powders were synthesized using the Ti-Modified Columbite Route. In order to study the effects caused by A-site substitution in 0.5Pb(Mg_{1/3}

3Nb_{2/3}O₃-0.5(AxPb(1-x)TiO₃) powders, samples with 0, 20 and 40mol% of barium were prepared. Single perovskite phase was gotten for all samples.

B536 - STRUCTURAL CHARACTERIZATION ON THE PHASE TRANSITION OF (Pb,Er)TiO₃ POWDERS

Miryam R. Joya (DF/UFSCar), Tânia M. Boschi (DF/UFSCar), Edson R. Leite (CMDMC-LIEC-DQ/UFSCar), Maria Fernanda C. Gurgel (CMDMC-LIEC-DQ/UFSCar), Valdemir dos Santos (CMDMC-LIEC-DQ/UFSCar), Elaine C. Paris (CMDMC-LIEC-DQ/UFSCar), Paulo S. Pizani (DF/UFSCar), Elson Longo (CMDMC-LIEC-IQ/UNESP) and José A. Varela (CMDMC-LIEC-IQ/UNESP)

(Pb_{1-x}Er_x)TiO₃ (PET) powders, with x varying from 0.01 to 0.08, were obtained using the polymeric precursor method (Pechini method). No secondary phases were observed by X-ray diffraction (XRD) analysis up to 2 mol% of erbium. It was observed that the tetragonality factor (c/a) decreases with the erbium concentration, indicating that the material is approaching to cubic phase. The softening of the E(LTO) mode and the behaviour of the damping factor clearly demonstrated this tendency of transition from a tetragonal to a cubic phase.

B543 - SEM AND AFM COMPOSED ANALYSIS OF CERAMIC ULTRA FINE PARTICLES OBTAINED BY ATMOSPHERIC PRESSURE DIELECTRIC BARRIER DISCHARGE PROCESS

Homero Santiago Maciel (ITA), Eliane Fatima Chinaglia (ITA), Marcos Massi (ITA), Choyu Otani (ITA), Wilfredo Irrazabal Urruchi (Univesidade Braz Cubas), Jossano Saldanha Marcuzzo (ITA) and Gilberto Petraconi (ITA)

The nanometric particles production and use science are more and more present in all products of high technology. The common example of their presence is the nano-particles of Fe₂O₃ to make ferromagnetic devices with less hysteresis losses. In the present work it is described the sample preparation method and the results obtained by complementary use of Scanning Electron Microscopy (SEM) and Atomic Force Microscopy (AFM) techniques) over the nanometric ceramic particles obtained from a Atmospheric Pressure Dielectric Barrier Discharge (APDBD) process.

B547 - THERMAL RESISTANCE OF PEROVSKITES WITH CERIUM FOR METHANE OXIDATION

Maria Conceição Greca (INT), Rogerio Amadeu Pereira (INT) and Marco André Fraga (INT)

Perovskite has been evaluated due to promising activity in catalytic combustion. The influence of cerium in such perovskites containing Co was studied. The combustion synthesis technique led to perovskite with a cubic system as revealed by XRD. High temperature promotes the transition of this structure to orthorhombic. The introduction of cerium partially replacing lanthanum in A position led to an improved thermal stability of the cubic structure until temperatures up to 1100 °C. The Ce in A position led to more homogeneous powders. A segregation of Sr was observed for some samples.

B555 - PIGMENTS WITH Mg₂SnO₄ STRUCTURE BY THE POLYMERIC PRECURSOR METHOD

Ieda Maria Garcia Santos (UFPB), Jackson Guedes Lima (UFPB), Carlos Alberto Paskocimas (UFRN), Maria Rita Cassia Santos (UFPB), Luciana Alves Nóbrega (UFPB), Elson Longo Silva (UNESP) and Antônio Gouveia Souza (UFPB)

This work aims at synthesizing, by the polymeric precursor method, nanometric pigments, with composition $Me_xMg_{2-x}SnO_4$, in which x varies from 0 to 0.15, Me = Fe^{3+} or Mn^{2+} . The structural, morphologic and optical properties were evaluated. All the samples presented high thermal stability from 600°C. The XRD results pointed out a single phase cubical spinel structure, with the exception of the addition of 7.5% molar addition of Mn or Fe. The colorimetric analyses show that the Fe^{3+} -doped samples present a yellow color, whereas the Mn^{2+} -doped sample displaying a brown red-brick color.

B556 - MICROWAVE ASSISTED COMBUSTION REACTION OF EUROPIUM DOPED ZnO POWDERS

Luciana Gama (UFCG), Ana C. F. M. Costa (UFCG), Bráulio Silva Barros (UFRN), Tatiana Silva Barros (UFCG) and Ruth H. G. A. Kiminami (UFSCar)

Europium doped ZnO powders were obtained by microwave assisted combustion reaction. The powders were characterized for X-ray diffraction and scanning electron microscopy. The results confirmed the formation of ZnO and small amount of Eu_2O_3 , as well as the influence of the europium concentration on the morphology of the powders.

B559 - SOLUBILITY LIMIT OF BORON ON Mg_2SnB_x SUPERCONDUCTOR PHASE

Carlos Alberto Moreira dos Santos (EEL - USP Lorena), Mário Sérgio da Luz (EEL - USP Lorena), Bento Ferreira (EEL - USP Lorena), Ausdinir Danilo Bortolozzo (EEL - USP Lorena), Elton da Silva Neves (EEL - USP Lorena) and Antonio Jefferson da Silva Machado (EEL - USP Lorena)

In this work will be shown a systematic studied in order to verify the upper solubility limit of B element on the Mg_2SnB phase. X-ray diffraction pattern confirm that the B element occupied interstitial sites in the antiferroite structure. The results of the electrical resistivity measurements as function of temperature display strongly dependent of synthesis temperature. Besides the magnetoresistance measurements with the applied magnetic field suggest a high critical upper field. Finally Hall effect measurement showed that the charge carriers are electron in contrast with MgB_2 that are hole.

B567 - INFLUENCE OF NET MODIFIER IN THE PROPERTIES OF CROMITE PIGMENTS

Antonio Gouveia Souza (UFPB), Carlos Alberto Paskocimas (UFRN), Luiz Soledade (UFPB), Elson Edmundo Longo (UNESP), Renata Ferreira Lins (UFPB), Severino Jackson Lima (UFPB), Sayonara Andrade Eliziário (UFPB) and Ieda M. Garcia Santos (UFPB)

Spinel-type oxides ($Me^{2+}Me_2^{3+}O_4$) represent one of the most studied classes of materials in solid-state science. In this study, MCr_2O_4 chromites (M = Ni^{2+} , Co^{2+} and Mg^{2+}) were synthesized by the polymeric precursor method. XRD patterns indicated that the chromites are crystalline with single phase at 600 °C, with well-defined peaks and spinel structure. Infrared spectra showed two bands characteristic of spinels, related to 1 and 2 frequencies, at 640 and 523 cm^{-1} , respectively. Different colors were obtained, according

to the modifier ion. All pigments are dark, being NiCr₂O₄ the darker one.

B568 - PIGMENTS OF $TiO_2:Cr, Sb$ OBTAINED BY DIFFERENT SYNTHESIS METHODS

Elson Longo (UNESP), Carlos Alberto Paskocimas (UFRN), Wilson Silva Junior (ICRA), Severino J. Guedes Lima (Ufpb), Harley Farias Dantas (UFPB), Raphael A. Sousa Mendes (UFPB), Fagner Ticiano G. Vieira (UFPB), Antonio Gouveia Souza (UFPB) And Ieda M. Garcia Santos (UFPB)

The synthesis method of TiO_2 -based ceramic pigments strongly influences their properties. Different synthesis methods can lead to the development of different colors, which are stable at high temperatures. The pigments were successfully synthesized both by the mixture of oxides and the polymeric precursor methods. In the present work, the ceramic pigments were characterized by XRD, TG, DTA, IR spectroscopy and colorimetry. The XRD results show that the rutile phase was obtained at 800°C (Pechini method) and 1000°C (mixture of oxides).

B569 - SYNTHESIS AND CHARACTERIZATION OF Sm_2O_3 NANOPARTICLES

Eliana Navarro Muccillo (IPEN), Reginaldo Muccillo (IPEN) and Eduardo Caetano Souza (IPEN)

Over the last few years great attention has been paid to samarium oxide for application as catalysts, solid electrolytes and in semiconductor devices due to its magnetic, electrical, and optical properties. The properties of nanosize powders have proved to be influenced by size, size distribution and shape of the constituting particles, which in turn depend on the characteristics of the synthesis. In this study, samarium oxide nanoparticles were synthesized by homogeneous precipitation. High-temperature X-ray diffraction and Raman spectroscopy were used to evaluate the precipitate.

B570 - INFLUENCE OF Sr^{2+} ADDITION ON THE PROPERTIES OF $Ca_{1-x}Sr_xSnO_3$, SYNTHESIZED BY THE POLYMERIC PRECURSOR METHOD

Elson Longo (UNESP), Antonio Gouveia de Souza (UFPB), Severino J. Guedes de Lima (UFPB), Hebert H. de Sousa Lima (UFPB), Marcelo Rogrigues Nascimento (UFPB), Soraia Carvalho de Souza (UFPB), Mary C. Ferreira Alves (UFPB) and Ieda M. Garcia dos Santos (UFPB)

$Ca_{1-x}Sr_xSnO_3$ (x = 0 to 1) was synthesized by the polymeric precursor method. This method is derived from the Pechini method and is quite simple, with high chemical homogeneity. This work aims at evaluating the influence of Sr^{2+} addition on the properties of $CaSnO_3$. The molar stoichiometry $Ca_{1-x}Sr_xSnO_3$ was used, with x = 0, 0.25, 0.50, 0.75 and 1, with characterization by TG, XRD and FTIR. The materials are single phase after heat treatment at 700 °C for 2 h. Carbonates are observed even after calcination.

B572 - Sm_2Fe_{17} PREPARED BY CALCIOTHERMIC REDUCTION AND DIFFUSION USING DIFFERENT RAW MATERIALS AND PROCESSING PARAMETERS

Rubens Hesse (UFSC), Paulo Antonio Pereira Wendhausen (UFSC), José Carlos Boareto (UFSC) and Juliano Soyama (UFSC)

The influence of basic parameters, such as raw materials, time and

temperature, on the preparation of $\text{Sm}_2\text{Fe}_{17}$ by calciothermic reduction and diffusion (CRD) has been investigated. Time and temperature were optimized for the formation of $\text{Sm}_2\text{Fe}_{17}$ with three different types of iron powder: carbonyl, sponge and water atomized. Microstructure and magnetic properties of the nitrogenated alloys were analyzed. $\text{Sm}_2\text{Fe}_{17}\text{N}_3$ produced with carbonyl iron powder had to be hydrogenated in order to obtain a high degree of texture.

B575 - COMBUSTION SYNTHESIS OF LaMO_3 (M = Ni, Co) POWDERS WITH PEROVSKITE STRUCTURE

Renata Barbosa (UFCG), Luciano Leal de M. Sales (UFRN), Genaro Zenaide Clericuzi (UFRN), Dulce Maria de Araújo Melo (UFRN), Bráulio Silva Barros (UFRN), Ana Cristina F. M. Costa (UFCG) and Roberto Carlos Bittencourt (CENPES-PETROBRAS)

LaMO_3 (M = Ni, Co) powders were successfully prepared by combustion reaction method, using urea as fuel. The samples were characterized by X-ray diffraction (XRD), thermal gravimetric analysis (TG), Fourier-transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM). The results obtained by XRD, confirmed the crystallization of the perovskite structure.

B584 - $\text{Li}_2\text{CO}_{1-x}\text{Ni}_x\text{Ti}_3\text{O}_8$, $\text{Li}_2\text{CO}_{1-3x/2}\text{Fe}_x\text{Ti}_3\text{O}_8$, $\text{Li}_2\text{Zn}_{1-3x/2}\text{Fe}_x\text{Ti}_3\text{O}_8$ AND $\text{Li}_2\text{Zn}_{1-3x}\text{Cr}_x\text{Ti}_3\text{O}_8$ NANOMETRIC PIGMENTS

Antonio Eduardo Martinelli (UFRN), Kírian Pimenta Lopes (UFSCar), Dulce Maria de Araújo Melo (UFRN), Francisco José Santos Lima (UFRN), Ademir Oliveira Silva (UFRN), Thyago A R Bulhões (UFRN), Lauro Pereira Neto (UFRN), Maria Suely Costa da Câmara (UFRN) and Elson Longo Silva (UFSCar)

The objective of this study was to produce inorganic pigments by a modified Pechini process. The compounds studied were doped $\text{Li}_2\text{Zn}_{1-x}\text{M}_x\text{Ti}_3\text{O}_8$ (M = Cr and Fe, $x=0.0, 0.08, 0.1$ and 0.2 mol) and $\text{Li}_2\text{Co}_{1-x}\text{M}_x\text{Ti}_3\text{O}_8$ (M = Ni and Fe, $x=0.0, 0.08, 0.1$ and 0.2 mol). The powders were heat treated in air at 500°C , 700°C or 1000°C for 1 h. The obtained materials were characterized by X ray diffraction, UV-Visible, thermogravimetric analysis and BET surface area measurements. The resulting powders were characterized by relatively high surface areas even though they were not subjected to high energy milling.

B587 - MAGHEMITE PHASE FORMATION IN COBALT DOPED HEMATITE CERAMIC SYSTEM ANALYZED BY THE RIETVELD METHOD

André Mincov Tenório (UEPG), José Caetano Zurita da Silva (UEPG), André Maurício Brinatti (UEPG), Kátia Zielasko (UEPG), Augusto Celso Antunes (UEPG), Sandra Regina Masetto Antunes (UEPG), André Vitor Chaves de Andrade (UEPG) and João Frederico Hass Leandro Monteiro (UEPG)

Iron oxides are well known by presenting important electric and magnetic properties. Samples of $-\text{Fe}_2\text{O}_3$ doped with cobalt amounts of 8, 16, 24 and 32% molar was prepared by Pechini Method and fired at 580°C . The analysis by the Rietveld Method shows that the formation of $-\text{Fe}_2\text{O}_3$ and $-\text{Fe}_2\text{O}_3$ phases occurs. Only hematite phase is identified when no dopant is present. With dopant addition, the maghemite spinel phase arises. The quantitative phase analysis by the Rietveld Method reveals that this maghemite quantity increases with dopant addition increase, and the hematite quantity

decreases.

B589 - PROPERTIES OF BaTiO_3 :PR SYNTHESIZED BY THE POLYMERIC PRECURSOR METHOD

Ieda M. Garcia dos Santos (UFPB), Antonio Gouveia de Souza (UFPB), Carlos Alberto Paskocimas (UFRN), Elson Longo (UNESP), Severino J. Guedes Lima (UFPB), Luiz E. Bastos Soledade (UFPB), Mary C. Ferreira Alves (UFPB), Hebert H. de Souza Lima (UFPB) and Soraia Carvalho de Souza (UFPB)

Barium titanate (BaTiO_3) presents interesting dielectric, ferroelectric and optical properties, being widely used in the production of capacitors and electro-optical devices, as well as thermistors. BaTiO_3 was synthesized, with addition of the chromophore ion Pr, substituting for Ba or Ti. The synthesis was carried out by the polymeric precursor method. The powder precursor was characterized by TG/DTA. After heat treatment at 800°C for 2 h, the material was characterized by XRD, FTIR and colorimetry. Colorimetry indicates that Pr^{3+} doping leads to an yellow color.

B591 - CHARACTERIZATION OF $\text{SrCo}_{0.5}\text{FeO}_3$ PEROVSKITE BASED MEMBRANE FOR USE IN THE CATALYTIC PARTIAL OXIDATION OF METHANE

Helena Prudencio de Souza (UFF) and Fabio Barboza Passos (UFF)

Perovskite based $\text{SrCo}_{0.5}\text{FeO}_3$ membranes were characterized by (XRD) and SEM. The prepared membrane showed a tetragonal crystalline phase and the formation of $\text{Co}_{3x}\text{Fe}_x\text{O}$ spinel phase and the structural intergrowth $\text{Sr}_4\text{Fe}_{6-x}\text{Co}_x\text{O}^{13+}$. The increase in the pressure used for preparation of membrane disks was investigated, besides the stability of the membrane under reaction conditions for partial oxidation of methane.

B595 - INFLUENCE OF SYNTHESIS CONDITIONS ON THE PROPERTIES OF Zn_2TiO_4

Antonio Gouveia de Souza (UFPB), Ieda M. Garcia dos Santos (UFPB), Elson Longo (UNESP), Marcia R. Santos Silva (UFPB), Luiz E. Bastos Soledade (UFPB), Mary C. Ferreira Alves (UFPB), Carlos C. Lima Santos (UFPB), Soraia Carvalho de Souza (UFPB) and Hebert H. de Souza Lima (UFPB)

This work to synthesize the inverse spinel with composition Zn_2TiO_4 :Zr, with different amounts of zirconium, synthesized by the polymeric precursor method. After milling and heat treatment, Zn_2TiO_4 :Zr nanometric powders were obtained. The TG curves indicate that calcination leads to a meaningful reduction of the carbon content. The XRD patterns showed that the presence of Zn_2TiO_4 single phase. The Zr^{4+} addition leads to the formation of a secondary phase. UV-visible spectra indicate that the heat treatment of the samples in an oxygen atmosphere leads to an increase in reflectance.

B600 - QUANTITATIVE DETERMINATION OF THE AMORPHOUS AND CRYSTALLINE PHASES OF THE CERAMIC MATERIALS UTILIZING THE X RAY DIFFRACTION TECHNIQUE

Nivaldo Cabral Kuhnen (UFSC), João Cardoso de Lima (UFSC), Patricia Bodanese Prates (UFSC), Cláudia Terezinha Kniess (UFSC), Humberto Gracher Riella (UFSC) and Ana Maria Maliska (UFSC)

This study is about the quantitative determination of the amorphous and crystalline phases of the ceramic materials developed with addition of the coal bottom ash. The quantitative determination was realized utilizing the X ray diffraction technique, through the methods proposed by Rietveld1 and Ruland2.

B610 - STRUCTURAL CHARACTERIZATION OF CoWO_4 SYNTHESIZED BY THE POLYMERIC PRECURSOR METHOD

Carlos E. F. da Costa (UFPA), Elson Longo (Unesp), Maria A. M.A. Maurera (UFPB), André L. M Oliveira (UFPB), Jailson M. Ferreira (UFPB/CEFET-PB), Thomas Scheller (UFPA), Sandro M. Torres (UFPB), Antônio Gouveia de Souza (UFPB) and Iêda M. G. Santos (UFPB)

This work aims at synthesizing CoWO_4 powders by the polymeric precursor method. Thermal analyses (TG/DTA) were carried out after a preliminary heat treatment at 300 °C. Crystallization took place at 400, 500, 600 and 700 °C. The characterization utilized the techniques of infrared spectroscopy (FTIR) and X-ray diffraction (XRD), whose results were refined by Rietveld method, using the Fullprof program, allowing obtaining a more accurate crystalline structure.

B613 - BLUE PIGMENTS WITH COMPOSITION Mg_2SnO_4 : CO^{2+}

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Ceramic materials with the spinel structure (AB_2O_4) have arisen a great interest in several research areas. Mg_2SnO_4 has been studied as it presents interesting properties as a high promising electroceramic material, due to be stable, displaying a low permittivity and low tangential losses. In this work, the Polymeric Precursor Method was used for the synthesis of pure and Co-doped Mg_2SnO_4 . The colorimetric analyses show that the Co^{2+} -doped samples present a blue coloration, with the sample calcined at 1000°C displaying a lighter hue than the sample heat treated at 900°C.

B614 - INFLUENCE OF SYNTHESIS CONDITIONS IN THE PROPERTIES OF NiFe_2O_4 PIGMENTS

Carlos Alberto Paskocimas (UFRN), Elson Longo Silva (UNESP), Severino Guedes Lima (UFPB), Luiz Bastos Soledade (UFPB), Camila Soares Xavier (UFPB), Ieda Garcia Santos (UFPB) and Antonio Gouveia Souza (UFPB)

Synthesis of NiFe_2O_4 by the polymeric precursor method was done in resins with pH values of 2 and 7, followed by milling of the precursor and calcination in O_2 atmosphere. Characterization was done by TG/DTA, XRD, FTIR and colorimetry. A dark brown pigment was obtained.

B617 - BROWN PIGMENTS BASED ON BARIUM HEXAFERRITE

Ieda Garcia Santos (UFPB), Severino Guedes Lima (UFPB), Carlos Alberto Paskocimas (UFRN), Elson Longo Silva (UNESP), Luiz Bastos Soledade (UFPB), Camila Soares Xavier (UFPB), Glaucio Soares Braga (UFPB) and Antonio Gouveia Souza (UFPB)

Barium hexaferrite, as permanent magnet, is widely used in electronic industries due to its excellent magnetic properties. In a fine particle form, barium ferrite is suitable for high-density perpendicular recording media. Its use as pigments was not found in literature. $\text{BaFe}_{12}\text{O}_{19}$ was synthesized by the polymeric precursor method, in pH values of 2, 6 and 10. After calcination at 600, 800 and 1000 oC, the material was characterized by XRD, FTIR and colorimetry. The color varied according to calcination temperature, indicating that Fe^{3+} reduction occurs.

B619 - STRUCTURAL AND OPTICAL CHARACTERIZATION OF Mg_2TiO_4 PIGMENTS

Carlos Alberto Paskocimas (UFRN), Elson Longo (UNESP), Severino J. Guedes de Lima (UFPB), José W. Martinez Espinosa (UFPB), Luiz E. Bastos Soledade (UFPB), Márcia R. Santos da Silva (UFPB), Antônio Gouveia de Souza (UFPB) and Iêda M. Garcia dos Santos (UFPB)

Spinel is a metastable phase, decomposing as MgTiO_3 and MgO at about 800 oC, followed by spinel recrystallization above 1100 oC. Raman and XRD patterns indicate the presence of a small amount of ilmenite in all samples. FWHM values from the XRD patterns indicate a higher long range order of Mn- and Fe-doped samples and a considerably lower order for Co-doped samples. On the other hand, the Raman peaks present an opposite behavior. These results are directly related to the color of the pigments.

B621 - STRUCTURAL AND COLORIMETRIC STUDY OF IRON TITANATE OBTAINED IN DIFFERENT ATMOSPHERES

Elson Longo (UNESP), Carlos A. Paskocimas (UFRN), Luiz E. B. Soledade (UFPB/LTM), Severino J. G. Lima (UFPB/LSR), Sayonara A. Eliziário (UFPB/LTM), Renata F. L. Silva (UFPB/LTM), Antônio Gouveia de Souza (UFPB/LTM) and Iêda M. G. Santos (UFPB/LTM)

The $\text{TiO}_2\text{-Fe}_2\text{O}_3$ system presents different crystalline structures. In this work, the compound with the 1 Fe: 2 Ti stoichiometry was synthesized by the polymeric precursor method. After the synthesis, the samples were calcined at 600, 800 and 1000oC in air and nitrogen. The XRD results in air show two and three phases, whereas in nitrogen amorphous powders were obtained. The visible spectra indicated that the samples calcined in air present reflection at the 600 – 700 nm region, with a brown color. Samples calcined in N_2 present a small reflectance at 700 nm, with a black color.

B625 - SYNTHESIS OF MAGNESIUM SPINEL COMPOUNDS FOR USE AS PIGMENTS

Elson Longo (UNESP), Luiz E. B. Soledade (UFPB), Severino J. G. Lima (UFPB), Roberlúcia A. Candeia (UFPB), Sayonara A. Eliziário (UFPB), Carlos A. Paskocimas (UFRN), Antonio Gouveia de Souza (UFPB) and Iêda M. G. Santos (UFPB)

In this work, MgCr_2O_4 and MgFe_2O_4 , displaying the spinel structure, were synthesized by the polymeric precursor method. The powders were characterized by XRD, FTIR and colorimetry. Both infrared spectra showed two bands characteristic of spinels, related to the 1 and 2 frequencies, at 640 and 523 cm^{-1} for MgCr_2O_4 , and 540 and 423 cm^{-1} for MgFe_2O_4 . The spectra in the visible region for both spinels present the highest reflectance between 600 and 650 nm. L^* values are similar. On the other hand, a^* and b^* parameters are very different. Both spinels are single phase, with very different colors.

B627 - EFFECT OF SYNTHESIS CONDITIONS ON THE PROPERTIES OF $-Al_2O_3:Ti$

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$-Al_2O_3$ and also TiO_2 have been used as catalytic supports, with excellent results. In this work, $-Al_2O_3:Ti$ samples were synthesized by the polymeric precursor method. Samples were synthesized with 0 to 10 mol % of TiO_2 . The effects of precursor milling, and calcination conditions (temperature and atmospheres of air and O_2) were evaluated. All materials were characterized by TG/DTA, XRD, IR and SEM. The presence of $-Al_2O_3$ was observed in some samples.

B628 - YELLOW PIGMENTS WITH STOICHIOMETRY $Zn_xNi_{1-x}WO_4$ OBTAINED BY THE POLYMERIC PRECURSOR METHOD

Elson Longo (UNESP), Severino J. G. Lima (UFPB/LSR), Marcia R. S. Silva (UFPB/LTM), Maria A. M. A. Maurera (UFPB/LTM), Luiz E. B. Soledade (UFPB/LTM), Glauco S. Braga (UFPB/LTM), Jailson M. Ferreira (UFPB/LTM), André Luiz M. Oliveira (UFPB/LTM), Carlos A. Paskocimas (UFRN/DEM), Antônio G. Souza (UFPB/LTM) and Iêda M. G. Santos (UFPB/LTM)

Tungstates have been widely applied in optical and electro-chromic devices. Thus, in this work, tungstates of the $Zn_xNi_{1-x}WO_4$ system were synthesized by the polymeric precursor method. The powders were milled in a attritor mill for 4h in alcohol medium and later submitted and later heat treated at 300°C in an oxygen atmosphere and later in air at 700°C for 2h being. The wolframite phase was formed. The characterization was carried out by TG/DTA, XRD, FTIR and colorimetry. Light absorption occurred between 465 and 482 nm, in the blue region, thus obtaining to yellow pigments.

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This work describes the optimized conditions for the preparation of cobalt aluminum silicate complexes through a simplified methodology. These materials, designated CoAlSi-NHG, were obtained by a non-hydrolytic sol-gel route involving the condensation of aluminum chloride with diisopropylether in the presence of cobalt chloride, followed by reaction with tetraethoxysilane. The obtained solids were heat-treated at various temperatures, and the resulting materials were characterized by UV-Vis spectroscopy, XRD, ^{29}Si and ^{27}Al NMR, TEM, surface area and DTA-TGA

B651 - PHOTOLUMINESCENCE OF EUROPIUM-DOPED ALKALINE EARTH TUNGSTATES PREPARED BY THE PECHINI METHOD

B. S. Barros (UFRN), A. S. Santos(UFRN), Z. R. Silva(UFRN), D. M.A. Melo (UFRN), A. C. Lima (UFRN), F. D.C. Lemos and S. A. Junior (UFPE)

$M_{1-x}Eu_xWO_4$ ceramics powders (where M = Ca, Sr and Ba) were prepared by the Pechini method. The content of europium used was 0.01. The resins were treated at 300°C for 2h. The precursor materials were calcined at 700°C. The characterization took place by thermogravimetric analysis, X-ray diffraction and photoluminescence spectroscopy.

B501 - ENCAPSULATION OF A HAZARDOUS WASTE USING A MATRIX OF MAGNESIUM PHOSPHATE CEMENT

André Luiz Tachard (UFSCar), Marcio Raymundo Morelli (UFSCar) and Daniel Veras Ribeiro (UFSCar)

Hazardous wastes require that its contaminants are immobilized. The critical necessity to develop a technology of stabilization and treatment at low temperatures was one of the main motivations for using the chemically bounded phosphate ceramics (CBPC's). The CBPC's were a good solution to treat hard wastes such as salts, leached ashes, liquids and sludges. In this work, the grinding dust was added into ceramic matrices (cement pastes and mortar of magnesium phosphate) in varied contents (0% to 40% in mass) that were later, evaluated by leaching/solubilization tests, according to NBR 10.004.

B514 - NANOSTRUCTURED CeO_2 SOLID SOLUTIONS FOR SOFC ELECTROLYTES

Dulcina M. P. F. de Souza (DEMA - UFSCar) and Camila Maria Lapa (DEMA - UFSCar)

Fuel cells are efficient and clean alternative to power generation. High operating temperature leads to design and stability problems. Nanocrystalline oxides have enhanced reaction kinetics and electrical conductivity. $Ce_{1-x}Gd_xO_{1-d}$ is the most suitable material for electrolytes for SOFC operation at 500–700°C. We have prepared Y_2O_3 and Gd_2O_3 doped CeO_2 by modified citrate process. Samples were sintered through different programs. A commercial nanopowder was also pressed and sintered. We could prevent grain growth and we are going on electrical characterization of sintered samples.

POSTER SESSION PB2 - TUESDAY, 10 OCTOBER

B642 - SPECTROSCOPIC PROPERTIES OF RARE EARTH IONS-DOPED CALCIUM ALUMINATE PREPARED BY POLYMERIC PRECURSOR METHOD

Paulo Nelson Marques dos Anjos (Universidade Estadual de Santa Cruz) and Ernesto Chaves Pereira (UFSCar)

Nano sized particles of Rare-earth-doped Calcium aluminate have been prepared by a Poly(vinyl alcohol) assisted polymeric precursor route. The structural properties of the powder were investigated by X-ray diffraction and Raman spectroscopy and optical properties were analyzed by absorption, emission and excitation spectroscopies. Two crystal structures were observed and the phase purity was controlled by the composition of the PVA polymeric precursor. The luminescent emission of the material exhibited high spectral purity with a sharp emission line $^5D_0 \rightarrow ^7F_2$ of the Eu^{3+} ion centered at the 16357 cm⁻¹.

B650 - COBALT ALUMINUM SILICATE COMPLEXES PREPARED BY THE NON-HIDROLYTIC SOL-GEL ROUTE AND THEIR CATALYTIC ACTIVITY IN HIDROCARBON OXIDATION

Eduardo José Nassar (Universidade de Franca), Paulo Sérgio Calefi

B518 - INTERGRANULAR FRACTURE AT ROOM TEMPERATURE IN PLASMA SINTERED IRON

Aloísio Nelmo Klein (UFSC), Ana Maria Maliska (UFSC), Giovanni Straffelini (UNITn) and Henrique Cezar Pavanati (UFSC)

Samples of unalloyed iron were sintered by plasma using the confined anode-cathode configuration. The presence of coarsened grains was observed. Intergranular fracture was observed when the sintered samples were tested by means of three point bending. This behavior is attributed to the presence of atomic hydrogen which produces intergranular embrittlement.

B523 - A STUDY OF THE STRUCTURAL AND THERMAL PROPERTIES OF COSB3 SKUTTERUDITE PREPARED BY MECHANICAL ALLOYING

Sergio Michielon de Souza (UFSC), Tarciso Antonio Grandi (UFSC), João Cardoso de Lima (UFSC) and Daniela Menegon Triches (UFSC)

An as-milled sample containing the CoSb₂ and CoSb₃ phases was prepared by mechanical alloying after 30 h of milling. The single phase CoSb₃ is obtained by annealing the as-milled powder at 550 °C. The structural properties of both as-milled and annealed samples were obtained by using X-ray diffraction (XRD) and Rietveld procedure method. The thermal properties (relaxation time, surface recombination velocity, thermal diffusivity and diffusion coefficient) were investigated by using Photoacoustic (PA) spectroscopy.

B524 - RAPID MANUFACTURE OF PA2200/HDPE BLEND PARTS WITH FUNCTIONALLY GRADED COMPOSITION USING SELECTIVE LASER SINTERING

Rodrigo A. Paggi (UFSC), Carlos Henrique Ahrens (UFSC), Gean Vitor Salmoria (UFSC), Janaina Lisi leite (UFSC), Rafael G. Oliveira (UFSC) and Alexandre Lago (UFSC)

Polymeric blends with functionally graded composition are an interesting alternative to obtain SLS parts with controlled structure/properties by the physical mixture of two or more materials. This work evaluate the structure and mechanical properties of PA2200/HDPE blends parts with functionally graded composition produced by selective laser sintering with a CO₂ laser. This blend showed that various micro-structures can be obtained depending on the process parameters and blend composition what permits the manufacturing of heterogeneous components with different mechanical properties along it: a component with a strong side and a low friction side for example.

B529 - COMPARISON OF THE DENSIFICATION OF COMPACTED OF Fe AND Ti

Alexandre Galiotto (UFSC), Aloísio Nelmo Klein (UFSC), Fabio Angheben Weber (UFSC), Assis Roberto Felippi (UNOESC), Carlos Viana Speller (UFSC) and Allan Seeber (UNOESC)

In this work we present results obtained during investigation of the compaction of irregular atomized iron powder and spherical titanium powder. The die body was supported by a spring so that it could perform in a double-action manner, currently termed "floating-action". The compaction machine used for pressing the powder was a computer controlled EMIC series DL30000 machine, with 300 kN max. load capacity. The various powders were compacted at pressures ranging from 300 to 600 MPa. The rate of compaction was measured at cross-head speeds of 5.0, 10.0 and

15.0 mm/min.

B531 - MECHANOCHEMICAL SYNTHESIS OF AL₂O₃-Al₃Nb POWDERS

Elíria Maria de Jesus Agnolon Pallone (PPGECM/USF), Daniel Rodrigo Leiva (PPGECM/UFSCar) and Walter José Botta F. (DEMa/UFSCar)

Intermetallics are being studied as interesting second phases for the formation of Al₂O₃-based composites for structural applications. In this work, Al₂O₃-Al₃Nb nanostructured powders were obtained by reactive milling of Al and Nb₂O₅. The powder transformations during milling, the microstructural evolution and the completeness of the reaction were studied by X-ray diffraction (XRD), scanning electron microscopy (SEM) and transmission electron microscopy (TEM). The SEM analysis shows a homogeneous distribution of the product phases and TEM shows a very fine microstructure.

B534 - SPHERICAL GLASS BODIES WITH CONTROLLED POROSITY BY SINTERING

Suelen Barg (University of Bremen), Dietmar Koch (University of Bremen), George Grathwohl (University of Bremen)

Porous glass bodies can be used for investigations of hydrodynamic processes, enabling the optical-laser measurements of the flow process in the pore network. The microstructural evolution of borosilicate and soda-lime glass beads in the three stages of sintering was investigated. The neck growth was investigated depending on glass, temperature and size of the beads. In the study, transparent glass bodies with controlled sizes and geometries were sintered up to the first stage using the Frenkel's sintering model to determine the time-temperature program for the intended porosity.

B538 - EVALUATION OF TREATED LEATHER SHAVING ADDITION ON THE MECHANICAL STRENGTH OF PORTLAND CEMENT MORTARS

Marcio Raymundo Morelli (UFSCar), Daniel Vêras Ribeiro (UFSCar) and André Luiz Tachard (UFSCar)

In Brazil, one of the most pollution-intensive industries is the tanning and processing leather industry. Based on materials engineering concepts, and from the experiences related in bibliography, this work proposed the leather shaving dissolution in phosphoric acid and later incorporation of this new product in Portland cement mortar; changes in the strength of mortar are very important, being the focus of this work. Mortars and cement pastes were made to serve as standards, and samples containing treated waste were produced in order to compare the results and to try explaining their causes.

B548 - QUASICRYSTALLINE PHASE FORMATION IN THE MECHANICALLY ALLOYED Al₇₀Cu₂₀Fe₁₀

Andrea Paesano Júnior (UEM), Ivair Aparecido dos Santos (UEM), Fernando Luis de Araújo Machado (UFPE), Scheyla Cadore (UEM) and Suzana Nóbrega de Medeiros (UEM)

In the present work, the formation of the Al₇₀Cu₂₀Fe₁₀ icosahedral phase by mechanical alloying the elemental powders in two different mills was investigated by X-ray diffractometry and Mössbauer spectroscopy. It was verified that the occurrence and evolution of the icosahedral phase was

faster in the shaker mill than in the planetary mill.

B561 - OBTAINING THE NiTi ALLOY USING PIM-POWDER INJECTION MOLDING

Lirio Schaeffer (UFRGS), Sílvia Dornelles Souza (UFRGS), Eduardo Cristiano Milke (UFRGS) and Wilberth Harold Deza Luna (UFRGS)

Advances in PIM, associated with the excellent properties of the NiTi alloy, enable manufacturing processes to create new ways to obtain the different components at a lower cost, even if obstacles are encountered due to the presence of contaminants. Therefore this study uses polyisobutylene to improve polymer extraction in the pieces.

B563 - THE POWDER METALLURGY INFLUENCES ON THE MAGNETIC PROPERTIES IN $Gd_{5.09}Ge_{2.0}Si_{1.88}$ ALLOY

Sérgio Gama (Unicamp), Alexandre Magnus Carvalho (Unicamp), Cleber Santiago Alves (UEM) and Paulo Vinicius Trevizoli (UEM)

The magnetic refrigeration is an innovative technology due to its high efficiency, low energetic consumption and its environmental characteristic. However the manufacturing process of the magnetocaloric materials is still a setback in effective application of those materials in refrigeration systems. Then, the powder metallurgy can be a viable alternative for being a technique of easy manipulation.

B566 - INFLUENCE OF HEATING RATE IN THE TRANSFORMATION OF PHASE TO ZrO_2

Elson Longo (UNESP), Jose Milton Matos (UFSCar), Valdemir Dos Santos (UFSCar) and Edson Roberto Leite (UFSCar)

Structure of ZrO_2 sample calcined at different temperature have been examined by X-ray diffraction (XRD). The material was obtained using Pechini method. XRD analysis of the material calcined at 700°C in microwaves oven presents pure monoclinic while in the conventional oven presented Tetragonal phase. However, the material treated in conventional oven showed pure monoclinic phase at 1000°C. As ZrO_2 tetragonal/cubic phase stabilization is based on the size effect, the previous results suggest that the calcination in microwaves oven increase the particle growth rate.

B573 - FERRITE STABILIZATION OF UNALLOYED IRON SAMPLES DURING PLASMA SINTERING WITH MO ENRICHMENT

Ana Maria Maliska (UFSC), Gisele Hammes (UFSC), Henrique Cezar Pavanati (UFSC) and Aloísio Nelmo Klein (UFSC)

Samples of unalloyed iron were sintered by plasma with simultaneous molybdenum enrichment using the confined anode-cathode configuration. The presence of more than 4 wt% of Mo on the surface induces the precipitation of ferrite, as the enrichment process evolves, the transformed region grows up.

B579 - QUALITATIVE AND QUANTITATIVE ANALYSIS OF WC-Co SYNTHESIZED IN HIGH ENERGY BALL MILLING

Franciné Alves Costa (UFRN), Uílame Umbelino Gomes (UFRN), Gislaine

Bezerra Pinto (UFRN) and Sergio Renato Soares (UFRN)

The purpose of this work is to investigate through X-ray diffraction (XRD) technique the effect, of the crystallite size and microdeformation in the line profile broadening of WC-Co synthesized in high energy ball milling. Basically, it will be investigated a possible association between crystallite size measured and his actual effect in the broadening of the x-ray diffraction lines. Preliminary results present an estimate of crystallite size associated only to its effect in the broadening of the x-ray diffraction lines.

B585 - THERMAL TREATMENT EFFECT ON THE (V) NIOBIUM-OXYPHOSPHATE STRUCTURE INTERCALATED WITH HYDROGEN PEROXIDE AND WATER

José Caetano Zurita da Silva (UEPG), Sandra Regina Masetto Antunes (UEPG), Marilena Valadares Folgueras (UDESC), André Vitor Chaves de Andrade (UEPG), Augusto Celso Antunes (UEPG) and Andressa Fantin (UEPG)

This work describes a study on the (V) niobium oxyphosphate unidimensional intracrystalline expansion through the inclusion of neutral molecules (water and hydrogen peroxide) inside its lamellas, besides the x-ray diffraction of the phases presented with the thermal treatment. The compounds obtained are lamellar, and the increase in temperature during thermal treatment results in increase in crystallinity and displacement of X ray diffraction peak $d(001)$ to the right.

B588 - EVALUATION OF THE POZZOLANIC POTENTIAL OF SUGAR CANE BAGASSE ASH

Ligia Leite Martins (CEFETRN/Uned), Antonio Eduardo Martinelli (UFRN) and Marcos Alyssandro Anjos (CEFETRN/Uned)

The following study aims to evaluate the pozzolanic potential of sugar cane bagasse ash obtained from the burn of sugar cane bagasse (residual ash) in the sugar cane industry in the state of Rio Grande do Norte. The milled bagasse ash was used in mortar of cement and sand, with partial substitution of cement by the ash, therefore, determining the rate of pozzolanic activity. The primary results of the sugar cane bagasse ash characterization show silica dioxide contents (SiO_2) higher than 65%, specified by the NBR 12653 and pozzolanic activity rate higher than 75%, according with the NBR 5752.

B590 - DEVELOPMENT OF SINTERED NICKEL ALLOYS

Waldir Ristow Junior (Lupatech), Aloísio Nelmo Klein (Ufsc), Moises Luiz Parucker (UFSC), Jose Daniel Biasoli De Mello (UFU), Roberto Binder (Embraco) And Bruno Maria Machado (UFSC)

The goal of this experimental research is to develop nickel alloys using Cr, P, W, Fe and C, as alloying elements. Powders of several phases containing these elements (nitrides, carbides and binary ferrous alloys) were blended with elemental carbonyl Ni powder to obtain the Ni alloys by homogenization during the sintering step. As expected, the sinterability and the mechanical properties are strongly affected by the type of additive (alloy carrier) used in the powder mixture. The results show that higher homogeneity and higher hardness is obtained when ferrous alloys are used as additive.

B592 - COMPACTION BEHAVIOUR OF DRY GRANULATED WALL TILE PASTE

Sidnei Jose Gomes Sousa (UENF/LAMAV), Marcela Figueira Pinto (UENF/LAMAV) and José Nilson França Holanda (UENF/LAMAV)

This work presents the results of a concerning study on the compaction behaviour of a wall tile paste. The granulated pastes were submitted the cold compaction process at pressures up to 60 MPa. The moisture content was varied between 0 and 10%. Compaction response and compaction rate diagrams were generated. The development of the microstructure was followed by SEM. The results showed that the compaction process is governed by two dominants mechanisms including rearrangement and plastic deformation. The better compaction efficiency was found to be influenced by the moisture content.

B598 - A STUDY OF THE INFLUENCE OF PROCESS CONTROL AGENTS ON THE MECHANICAL ACTIVATION OF Nb₇₅Al POWDER MIXTURES USING EXPERIMENTAL DESIGN

Cláudio José Rocha (IPEN), Valeria Sá Gonçalves (IPEN) and Ricardo Mendes Leal Neto (IPEN)

The influence of the process control agents on high-energy ball milling (SPEX®8000) of niobium and aluminum powder mixtures (Nb₇₅Al) has been investigated using factorial experimental design. Different PCAs, e.g. stearic acid, ethanol, methanol and cyclohexane, were added to each batch of a particular powder mixture in proportions that varied from 1 to 2 wt. % of the overall powder mass. The results showed a strong influence of the agents over the characteristics of milled powders and also over the density of combustion reacted pellets from these powders.

B599 - OBTAINING AND PHASE STABILITY OF Nb₃Al SUPERCONDUCTORS USING MECHANICAL ALLOYING

Alfeu Saraiva Ramos (UNIVAP), Felipe Antunes Santos (USP-Lorena) and Durval Rodrigues Junior (USP-Lorena)

The development of Nb₃Al and Nb₃Sn superconductors is of great interest for the applied superconductivity area. The Nb₃Sn is the superconductor, in the form of multifilamentary wires and cables, used to construct the systems for nuclear fusion tests (ITER, Cadarache, France)1-2 and for the new particle accelerator of the CERN (LHC, Geneva, Switzerland). These intermetallic composites are regularly obtained using heat treatments of phase reaction and formation at high temperatures, after the fabrication of the final superconducting wires.

B605 - SINTERABILITY STUDY OF COMPOSITE Fe/MoS₂

Roberto Binder (EMBRACO), Cristiano Binder (UFSC), Alexandre Galiotto (UFSC), José Daniel Biasoli de Mello (UFU) and Aloisio Nelmo Klein (UFSC)

In the present work the sintering of iron powder was studied considering molybdenum sulfide (MoS₂) powders as additive, to attain composite with solid lubricity by second phase particles in the material bulk. In order to produce composites self-lubricant, pressing and sintering properties of mixtures of iron and disulfide molybdenum was investigated. The metallographic evolution of composite during sintering was studied. As result sulphide decompose forming iron sulphide and molybdenum into matrix ferritic.

B606 - MAGNETIC PROPERTIES EVALUATION OF NEAR EQUIATOMIC FECo ALLOYS OBTAINED BY MIM

Ricardo Machado (Steelinject), Mauricio Rigoni (UFSC), Marcelo Silveira Anjos (UFSC), Nelson Jhoe Batistela (UFSC), Paulo Antonio Pereira Wendhausen (UFSC), Aline Silva (UFSC) and Waldyr Ristow Junior (Steelinject)

The present work has the objective to investigate some properties of near equiatomic FeCo alloys when fabricated by Metal Injection Molding (MIM). The study will present analyzes of how the changes in chemical composition and sintering cycle affect the final magnetic properties.

POSTER SESSION PB3 - WEDNESDAY, 11 OCTOBER

B537 - DEVELOPMENT OF EMPIRICAL MODEL OF COMPOSITIONAL PHASE TRANSITION IN FERROELECTRIC (PB,CA)TiO₃ SOLID SOLUTION

José Arana Varela (LIEC/UNESP - Araraquara), Edson Roberto Leite (LIEC/UFSCar), Poty Rodrigues de Lucena (LIEC/UFSCar), Rafael Oliveira da Silva (LIEC/UFSCar) and Elson Longo (LIEC/UNESP - Araraquara)

Pb_{1-x}Ca_xTiO₃ powders were synthesized by the polymeric precursor method, and an empirical model was developed using the intensities of the diffratogram peaks of the powder solid solution of Pb_{1-x}Ca_xTiO₃ for x=0, 0.25, and 0.50, based in the structure factor equation.

B541 - A HALOGEN LAMP FURNACE TO SYNTHESIZE NANOPARTICLES

Maria Regileuda Moraes Monteiro (UFC), Paulo Stheferson Diniz Nobre (UFC), Tiago Silva Rodrigues (UFC), Cristiano Teles Meneses (UFC) and José Marcos Sasaki (UFC)

In this a furnace was developed based on halogen lamp, in which have showed to be efficient to synthesize NiO nanoparticles for temperature range between 30 and 700oC. The obtained particles present sizes between 5 nm and 43 nm, and good uniformity in the particles when compared to others commercial furnaces.

B546 - MAGNETOCALORIC EFFECT IN THIN FILM OF MNAS

Lisandro Cardoso (UNICAMP), Adenilson Oliveira dos Santos (UNICAMP), Adelino A. Coelho (UNICAMP), Sergio Gama (UNICAMP), Ariana de Campos (UNICAMP), José Humberto Dias da Silva (UNESP/Bauru) and Douglas Marcel Gonçalves Leite (UNESP/Bauru)

The discovery of the magnetocaloric effect in MnAs was first reported by Wada [1] reaching a maximum value of 40 J/(kg.K). This material presents a ferromagnetic to paramagnetic first order transition at a temperature of 318K. In this work we present the obtaining of MnAs thin films the sample was characterized magnetic and X-rays diffraction analyses on the silicon substrata, the transition temperature was of 316 K and the analyses for the refinement of Rietveld confirmed that a hexagonal structure, type NiAs.

B558 - CARBON TARGETS FOR NANOTUBES PRODUCTION BY LASER ABLATION

Aloiso Nelmo Klein (UFSC), Pedro Luís Dias Magalhaes Lopes (Universidade Aveiro), Roberto Marchiori (UFSC) and Alexandre Lago (UFSC)

Nd-YAG high intensity pulsed laser ablation of carbon plus metals target was used to obtain CNT's. The target, usually made by pressing the powder mixture with subsequent thermal processing, must withstand the pulses. We determined the compacting curves and final density of targets with different amounts of Ni and Co. The target mechanical behaviour was tested as function of target composition, compaction pressure and thermal conditions. The optimal composition of target and parameters of compaction were found. Analyses were carried out with SEM, Optical Microscope and Stereoscopic Microscope

B576 - ELECTROCHEMICAL EVALUATION OF THE SURFACE AREA OF CERAMIC REINFORCED SINTERED STEEL ELECTRODES AFTER GALVANOSTATIC AGEING

Rubens Maribondo Nascimento (UFRN), Uílame Umbelino Gomes (UFRN), Hélio Scatena Júnior (UFRN), Antonio Eduardo Martinelli (UFRN), Ariadne Souza Silva (UFRN) and Bruna Freitas Guedes (UFRN)

Particle reinforced steels have been sintered to fulfill the requirements for industrial production of gases. In the present study, nine M2-FeNbC steels samples of different compositions were sintered in resistive furnace according to a statistical planning and evaluated prior to and after galvanostatic ageing to estimate the effect of microconstituents on the surface area. An electric circuit equivalent to the electrode was proposed. From that, it was possible to evaluate the surface area of the electrodes both before and after galvanostatic ageing using capacitance values. The results revealed that the galvanostatic method resulted in consistent values of capacitance (~ 0.723 F.cm⁻²) with respect to mercury electrodes (~ 10-6 F.cm⁻²) and that large surface areas of porous resulted in proportionally high values of capacitance.

B607 - STUDY OF CARBONACEOUS MATERIALS PRODUCED FROM MUNICIPAL SOLID RESIDUES TREATMENTS VIA PLASMA

Homero Santiago Maciel (ITA), Otani Choyu (ITA), Tatiana Bendo (IPT), Oskar Wessel Bender (IPT), Antonio Carlos da Cruz (IPT), Maria Antonia Santos (IPT), Marcos Massi (ITA), Aparecido Reis Coutinho, Eliane Fatima Chinaglia (ITA) and Gilberto Petraconi (ITA)

The objective of the present work is to carry out an initial study on the production of carbonaceous materials and synthesis gas through of the processing of municipal solid residues using the thermal plasma technology as an alternative destination route to incineration and landfilling techniques.

B622 - SYNTHESIS OF Sn⁴⁺ -DOPED Zn₂TiO₄ POWDERS AND THIN FILMS

Elson Longo (UNESP), Antonio Gouveia Souza (UFPB), Iêda Garcia Santos (UFPB), José Martinez Espinosa (UFPB), Luiz Bastos Soledade (UFPB), Breno Sousa Capistrano (UFPB), Hebert Souza Lima (UFPB), Mary Ferreira Alves (UFPB) and Carlos Cristiano Santos (UFPB)

The development of amorphous semiconductors displaying photoluminescence, electroluminescence or non-linear optical properties has been investigated. They are particularly interesting in large devices or in cases where cost is an important factor. In the present work, Sn⁴⁺-doped Zn₂TiO₄ powders and thin films were synthesized by the polymeric precursor method. The sample characterization was undertaken by XRD and IR spectroscopy. Single phase Zn₂TiO₄ powders were obtained, with small amounts of impurities such as hydroxides, and carbonates, according to the infrared spectra.

B632 - THE "DIAMOND - SILICON CARBIDE" COMPOSITE

Elisa Nascimento Nunes (UENF), Ana Lúcia Dieguez Skury (UENF), Guerold Sergueevitch Bobrovitchii (UENF) and Rômulo Crespo Tardim (UENF)

"Diamond-SiC" polycrystals were produced by sintering through high pressures (8,0GPa) and high temperatures (2000°C), using the method of SiC infiltration in the liquid phase inside the eskeleton made of diamond. This method made possible the formation of SiC-liquid phase outside the diamond, and also the infiltration of only SiC in the diamond eskeleton. This process does not result in damage to the diamond grains and allows the obtainment of a strength structure and wearing resistant.

B645 - FOUNDRY SAND UTILIZATION FOR RED CERAMIC PRODUCTION

Haroldo Araujo Ponte (UFPR), Vsevolod Mymrine (UFPR) and EDNA BERONHEIRO SIGNORELLI TOLEDO (UFPR)

The advantages of foundry sand utilization as the main component for ceramics production are reduction of cost and natural resources disposal and environment protection. The obtained ceramics' properties were studied by XRD, XRF, SEM, leaching and solubilization demonstrated the possibility of foundry sand utilization for red ceramics production.

B521 - HOMOGENIZATION AND PRODUCTION OF INTERSTITIAL Sm₂Fe₁₇N_x USING TWO DIFFERENT WAY OF HOMOGENIZATION OF INDUSTRIALLY MELTED Sm₂Fe₁₇

Marcos Daniel Vozer Felisberto (UFSC), Abio Valeriano de Andrades Pinto (UFSC) and Cristiano da Silva Teixeira (UFSC)

With aim of perfecting production of interstitial Sm₂Fe₁₇N_x by plasma processing, we have studied the influence of Sm₂Fe₁₇ homogenization on magnetic properties of the interstitial Sm₂Fe₁₇N_x. Aliquots taken from 5 kg lots of Sm₂Fe₁₇ were homogenized by two methods and then aliquots were plasma processed

B532 - THE EFFECT OF THIN POLYETHYLENE LAYER DEPOSITION ON THE SURFACE OF POROUS UHMWPE MEMBRANE

Hélio de Lucena Lira (UFCG), Laura Hecker de Carvalho (UFCG) and Tânia Lúcia Leal (UFCG)

The aim of this work is to investigate the effect of thin polyethylene layer deposition on the surface of porous UHMWPE (ultra high molecular weight polyethylene). The HDPE (high density polyethylene) solution was prepared in

concentration of 1.032g/l of HDPE dissolved in toluene in the temperature of 106°C. The thin polyethylene layer deposition was characterized by separation selectivity, flow permeation of synthetic effluent and SEM. The coating with HDPE produced homogeneous deposition on membrane surface, a reduction in pore size and consequently a flow reduction and better selectivity.

B554 - SUPERCONDUCTIVITY IN Nb5Ge3Cx COMPOUND

Antonio Jefferson da Silva Machado (EEL - USP Lorena), Carlos Alberto Moreira dos Santos (EEL - USP Lorena) and Ausdinir Danilo Bortolozo (EEL - USP Lorena)

The investigations on the superconducting properties of the Nb5Ge3Cx compounds were carried out. Polycrystalline samples with nominal compositions Nb5Ge3Cx by solid state reaction were prepared. The experimental diffractograms reveal that the solubility limit of C is agreement with the Nb5Ge3C stoichiometry and the hexagonal symmetry is stabilized. These results are consistent with the crystallographic simulation performed through of software. The results of the electrical resistivity measurements as function of the temperature of the sample with Nb5Ge3C shown superconductivity below T=7.6K.

B581 - ATTAINMENT AND STRUCTURAL CHARACTERIZATION OF AMORPHOUS NITI ALLOYS

João Carlos Krause (URI), Marcio Diniz Fin (URI) and Daiana Mello Margutti (URI)

Abstract – In this work we use the experimental technique of mechanical alloying for the attainment of Ni0.7Ti0.3 alloys in the amorphous phase as a function of bpr, the rotation of the mill and the time of milling. Samples with bpr of 1:9 and 1:6 had been produced, with rotation of 530 and 900rpm, respectively. The analysis with x-ray diffraction of the first and second sample show the appearance of distinct peaks referring to pure Ni, in the fcc structure, and Ti pure in hcp structure., i.e., the x-ray spectra confirmed that amorphous alloys were not formed in this process.

B503 - RAMAN SPECTROSCOPY OF CARBON MATERIALS CHARACTERIZATION

Carlos Alberto Achete (Inmetro/COPPE), Cristiano Leite Fantini (Inmetro), Inayá Corrêa Barbosa Lima (Inmetro) and Elza Castro Vidaurre (Univ. Nac. Salta/Argentina)

Raman Spectroscopy is a measurement of frequency and intensity of the inelastically scattered light from a given material and the its spectrum gives information on the vibrational modes of a moleculae. In this research we have studied the Raman spectrum of different allotropic and morphologic form of carbon materials, such as diamond films, carbon nanotubes and amorphous carbon thin films. Through Raman spectrometry it is possible to do the micro structural characterization of the polymeric materials elucidating basic information about their performace and composition.

B504 - SYNTHESIS AND CHARACTERIZATION OF CU, (MG, ZN), AL- HYDROTALCITE LIKE COMPOUNDS

Killian A. Ferreira (EQ/UFRJ), Nielson F.P. Ribeiro (PEQ/COPPE/UFRJ), Mariana M. V. M. Souza (EQ/UFRJ) and Martin Schmal (PEQ/COPPE/UFRJ)

Cu-Mg-Al and Cu-Zn-Al hydrotalcite like compounds (HTLCs) were prepared by co-precipitation and the derived catalysts were obtained by calcination at 500oC. The XRD patterns of HTLCs precursors showed that all the structures are isostructural with the hydrotalcite, with a higher ordinance of the lamellar layers when Mg²⁺ is replaced by Zn²⁺. After calcination, the lamellar structure disappears and SEM micrographs showed that the particle size distribution of CuZnAl is more homogeneous but with much lower porosity than the CuMgAl sample.

B519 - PRODUCTION AND CHARACTERIZATION OF SUB MICROMETER HOLLOW NI-P SPHERES BY CHEMICAL REDUCTION

Aloisio Nelmo Klein (UFSC), Fernando Lazaro Bernardo (UFSC), Daniel Girardi (UFSC), Valderes Drago (UFSC) and Cristian Bernardi (UFSC)

Hollow spheres of Ni0.93P0.07 amorphous alloy with diameter of 0.28 μm and low dispersivity was obtained by hydrothermal autocatalytic reduction of nickel ions using an amphiphilic vesicle as template. The sample was characterized by DSC, TGA, IR, XRD, SEM and EDS analysis.

B522 - INTERCALATION OF A METALLO-ENZYME MIMETIC COPPER COMPLEX INTO HEXANIObATE NANOSCROLLS AND EVALUATION OF ITS CATALYTIC PROPERTIES

Ana Maria da Costa Ferreira (IQ-USP), César Augusto Sales Barbosa (IQ-USP), Wendel Andrade Alves (IQ-USP), Marcos Augusto Bizeto (IQ-USP) and Vera Regina Leopoldo Constantino (IQ-USP)

The layered hexaniobate K4Nb6O17 can be exfoliated by using an appropriate combination of interlayer cation, solvent and intercalation agent. The delaminated layers can be further coiled into hollow tubular particles by easy soft chemistry routes. The scrolled particles maintain the intercalation properties of pristine niobate. In this work it is reported the immobilization of 2-[2-(2-pyridyl)ethylimino-1-ethyl]pyridine-imidazole copper(II) into the hexaniobate nanoscrolls and its catalytic properties were evaluated on the oxidation of catechol using hydrogen peroxide.

B574 - FIRST-ORDER STEREOLOGICAL CHARACTERIZATION OF POROUS MEDIUM FROM SINGLE SECTIONS: AN APPLICATION

FERNANDES PERES CELSO (UFSC) AND OLIVEIRA VIRGÍLIO THALES (UFSC)

A stereological study of a reconstructed microstructure of a porous media was realized from single sections. Geometric parameters as the porosity, surface density, surface-weighted mean volume of particles, and volume-weighted mean surface of particles will be determined using an unbiased approach to stereology. The input parameters of the geometric reconstruction were compared with the 3D first-order parameters estimated in IUR sections of this configuration space.

B511 - ION EXCHANGE IN A LI2O – AL2O3 – SIO2 GLASS POWDER AND ITS INFLUENCE ON SINTERING WITH CONCURRENT CRYSTALLIZATION

Oscar Peitl Filho (UFSCar), Gustavo Rocha Paula (UFSCar), Viviane Oliveira Soares (UFSCar) and Edgar Dutra Zanotto (UFSCar)

We produced superficial modifications in a Li₂O – Al₂O₃ – SiO₂ glass powder by ion exchange to produce a highly dense glass-ceramic via sintering with subsequent crystallization.

B516 - PREPARATION OF SINTERED POROUS POLYMER FILTERS FOR OIL/WATER SEPARATION

Tatianny Soares Alves (UFCEG), Hélio de Lucena Lira (UFCEG), Laura Hecker de Carvalho (UFCEG) and Tânia Lúcia Leal (UFCEG)

The present work deals with the influence of sintering time and particle size distribution, on the performance of ultra high molecular weight polyethylene (UHMWPE) membranes to be used in the purification of petroleum industry effluents. The operational conditions were: a) 200°C for 60 and 90 minutes; b) UHMWPE powder particle size: fractions passing through sieves of #80, #100 and #200 mesh. Our data indicated that the best oil/water separation performance was achieved with the UHMWPE membrane manufactured with the powder which passed through the #200 sieve and sintered for the longest time.

B513 - DIELECTRIC PROPERTIES OF HDPE/ POLYANILINE BLENDS

Leni Akcelrud (UFPR), Paula Cristina Rodrigues (UTP), Marilda Munaro (Lactec), Edemir Luiz Kowalski (Lactec), Guilherme Jurkevicz Delben (UFPR/Lactec), Renê Robert (Lactec) and Vitoldo Swinka-Filho (Lactec)

The effect of molecular composition on the dielectric properties of High density Polyethylene/Polyaniline blends has been investigated. The frequency domain impedance analysis results showed that the dielectric losses increase proportionally to the polyaniline concentration. The influence of polyaniline doping on the dielectric properties is currently under investigation.

B502 - POTABLE WATER FILTRATION SLUDGE: USE AS WORKABILITY-AID IN INDUSTRIAL MORTARS

Ana M. Segadães (DECV), Luis Silva (Weber-Portugal), Fabiano Raupp-Pereira (DECV), Dachamir Hotza (UFSC) and João A. Labrincha (DECV)

This work describes the study of the potential use of the sludge generated in potable water filtration/cleaning operations (waste material) as workability-aid in rendering/plastering mortars. A commercial mortar was used as reference and several formulations were investigated, containing the waste material and sodium phosphate (XRD, Figure 1) instead of the sodium enriched bentonite (DTA, Figure 2) traditionally used as workability-aid and setting retarder in cement based compositions. Fresh mortars were characterised in terms of plasticity as a function of elapsed time. The results obtained show the dominant role of sodium ions in the mortar workability and suggest that the replacement of bentonite by an equivalent amount of sodium phosphate added waste material (ca. 0.25 wt%) is technically feasible.

B533 - CERAMIC BODIES PRODUCED WITH BOTTOM ASH AND THE INFLUENCE OF GRANULOMETRY ON THEIR TECHNOLOGICAL PROPERTIES

Carlos Pérez Bergmann (UFRGS) and Daniela Lupinacci Villanova (UFRGS)

The influence of the raw material granulometry on the technological

properties of ceramic bodies produced from bottom ash and glass cullet was evaluated. Mixtures of 50wt% bottom ash and glass were dry pressing and fired at 1120 and 1020°C during 1 to 6h. The particle size of one of the components had below 125 and 75 m, the other was constant (<180 m). The effect of smaller particles was significant for linear shrinkage, but not for water absorption. Finer bottom ash particles contributed to the formation of smaller pores in the ceramic bodies, improving their mechanical resistance.

B540 - RED CERAMICS PRODUCED FROM DIFFERENT INDUSTRIAL WASTES

Ricardo Augusto Ribeiro (UFPR), Vsevolod Mymrine (UFPR), Vanderlei Mateus Tallini (UFPR) and Haroldo de Araujo Ponte (UFPR)

This research involved the development of new types of red ceramics from class I and II wastes, using different industrial residues such as sludge (WTP sludge, foundry sand, glass residues, residual salts) and clay. The results showed high flexural strength and low values of water absorption and linear retraction, characterizing the good sintering of the materials and vitreous formation, ensuring low values of solubilization and leaching.

B539 - EXHAUST POWDER AND OTHER INDUSTRIAL WASTES APPLIED AS RAW MATERIAL IN THE DEVELOPMENT OF CONSTRUCTION MATERIALS

Vanderlei Mateus Tallini (UFPR), Vsevolod Mymrine (UFPR), Ricardo Augusto Ribeiro (UFPR) and Haroldo de Araujo Ponte (UFPR)

This paper reports on the use of solid industrial wastes, particularly exhaust particulates, foundry sand, residual galvanic glass and automotive battery acid inertization salts, as raw materials in the development of high performance construction materials. The results confirmed the possibility of exhaust powder utilization as raw material for ceramics production, which explain the characteristics obtained, i.e., high strength (till 13 MPa) and low values of water absorption, retraction, solubility and leaching in accordance with the demands of international standards.

B536 - STRUCTURAL CHARACTERIZATION ON THE PHASE TRANSITION OF (PB,ER)TiO₃ POWDERS

Miryam R. Joya (DF/UFSCar), Tânia M. Boschi (DF/UFSCar), Edson R. Leite (CMDMC-LIEC-DQ/UFSCar), Maria Fernanda C. Gurgel (CMDMC-LIEC-DQ/UFSCar), Valdemir dos Santos (CMDMC-LIEC-DQ/UFSCar), Elaine C. Paris (CMDMC-LIEC-DQ/UFSCar), Paulo S. Pizani (DF/UFSCar), Elson Longo (CMDMC-LIEC-IQ/UNESP) and José A. Varela (CMDMC-LIEC-IQ/UNESP)

(Pb_{1-x}Er_x)TiO₃ (PET) powders, with x varying from 0.01 to 0.08, were obtained using the polymeric precursor method (Pechini method). No secondary phases were observed by X-ray diffraction (XRD) analysis up to 2 mol% of erbium. It was observed that the tetragonality factor (c/a) decreases with the erbium concentration, indicating that the material is approaching to cubic phase. The softening of the E(LTO) mode and the behaviour of the damping factor clearly demonstrated this tendency of transition from a tetragonal to a cubic phase.

B608 - EVALUATION OF THE PROCESSING CONDITIONS IN DEVELOPMENT OF CERAMIC FLOOR

Carmeane Effting

This work has as objective to design thermally comfortable ceramic floor tiles and the analysis of the thermal and mechanical properties of these materials with the variation of the processing temperature. The results indicated an increase of the porosity by incorporation of refractory material in industrial atomized ceramic powder, which results in the most comfort when the surfaces of the human bare feet are in contact with the pavement.

B611 - EFFECT OF HIGH-ENERGY GRINDING ON YTTRIA-ZIRCONIA POWDER DEAGGLOMERATION

Sergio Luiz Mineiro (INPE/CTE/LAS) and Maria do Carmo de Andrade Nono (INPE/CTE/LAS)

In this work a high-energy grinding was used to deagglomerate an yttria-zirconia nanometric powder. Through particle size distribution curves and SEM observations it was verified that the grinding reduces the particle sizes and it narrowed the range of sizes. The bonding between the particles of the remaining agglomerates is expected to be much stronger than the bonding between particles which are only attracted by van der Waals interaction, needing a larger duration of grinding and or the use of a higher rotation to separate these particles.

B612 - AN EVALUATION OF THE EFFECT OF POROSITY ON THE MAGNETIC PROPERTIES OF SOFT MAGNETIC NICKEL-IRON ALLOYS

Marcelo Silveira Anjos (UFSC), Nelson Jhoe Batistela (UFSC), Paulo Antônio Pereira Wendhausen (UFSC), Aline Silva (UFSC), Juliana Augusta Shoda (UFSC), Ricardo Machado (Steelinject) and Waldyr Ristow Jr. (Steelinject)

Nickel-iron alloys have found application as specific high-technology parts, due to their strength, corrosion resistance, conductivity and, specially, thermal expansion and magnetic permeability. In this work the influence of porosity on the soft magnetic properties of Metal Injection Molded nickel-iron alloys was evaluated by comparing BH curves of the samples. Results obtained with a hysteresigraph showed a tendency that denser samples exhibit higher values of induction.

B616 - LANTHANUM BASED PEROVSKITES, OBTAINED BY THE POLYMERIC PRECURSOR METHOD

Antonio Gouveia Souza (UFPB), Severino Guedes Lima (UFPB), Iêda Garcia Santos (UFPB), Érika Pinto Marinho (UFPB), Danniely Silva Melo (UFPB) and Dulce Araújo Melo (UFRN)

Ceramic oxides with perovskite structure have been arising great interest in different areas, such as catalysis, optical, electrical and magnetic materials. In this work, LaCaO₃ perovskite powders were synthesized by the polymeric precursor method. The precursor was calcined at 300 °C/2 h. The material was calcined at 700, 800 and 900 °C por 4 h. Characterization was made by XRD, with calculation of lattice parameter, crystallite size and relative crystallinity. Two different types of perovskite were obtained, the rhombohedral and cubic, according to Ca addition and calcination temperature.

B623 - INFLUENCE OF HIGH ENERGY MILLING ON THE PROPERTIES OF TiO₂:Al³⁺

Severino J. G. Lima (UFPB/LSR), Iêda M. G. Santos (UFPB/LTM), Maria R.C. Santos (UFPB/LTM), Danniely S. Melo (UFPB/LTM), Caroline G. Sousa (UFPB/LTM), Andréa S.G. Costa (UFPB/LTM), Elson Longo (UNESP) and Antonio G. Souza (UFPB/LTM)

The binary system Al₂O₃:TiO₂ was studied with addition of up to 10 mol % of Al₂O₃. Synthesis was done by the polymeric precursor method. The powder precursors were characterized by TG/DTA and crystalline powders by IR and XRD. The XRD results indicate that the Al³⁺ addition into TiO₂ leads to the stabilization of anatase phase. The unmilled 5 and 10 mol % samples are composed only by anatase, what is very interesting for HDS, since anatase leads to a higher catalytic activity.

B630 - INFLUENCE OF THE BALL TO POWDER WEIGHT RATIO IN THE NBN FORMATION BY REACTIVE MILLING OF THE NIOBIUM

Silvio Francisco Brunatto (DEMEC / UFPR), Kleber Machado (DF / UFPR) and Dirceu Jardim (PG-Mec / UFPR)

The influence of the ball to powder weight ratio in the reactive milling of the niobium was studied by using a Pulverisette 5 mill, nitrogen atmosphere, 10 and 20 mm diameter balls, and ratios of 60:1, 120:1, 180:1. The analysis of the X - ray diffraction show the beginning of the formation of NbN for 20 hours milling.

B639 - HIGH ENERGY MILLING OF MOLYBDENUM PARTS: INFLUENCE OF THE SPEED AND TIME

Silvio Francisco Brunatto, Silvio Buchner, Dario F Sanches, Kleber Machado and Dirceu Jardim

The influence of the speed and time in the high energy milling of the molybdenum parts was studied using a Pulverisette 5 mill, under air, using 30:1 ball to powder weight ratio. The X-rays diffraction results show Mo particles and the beginning of Mo₂C formation for 4 hours milling time, which is probably related to the carbon contamination present on solid lubricant.

B640 - EFFECT OF Nb₂O₅ ON THE MICROSTRUCTURE AND CRYSTALLINE PHASE COMPOSITION OF ZIRCONIA CERAMICS

Sérgio L. Mineiro (INPE), Maria C.A. Nono (INPE) and José Vitor C. Souza (INPE)

In this paper, m-ZrO₂ ceramics have been doped with Nb₂O₅ to study this effect on microstructure and phase composition on samples at 1500 oC. The results showed similar microstructure of the sintered samples with 15 and 20 wt.% Nb₂O₅ with porous distribute in matrix and XRD profiles presented the beginning of the tetragonal phase formation (JCPDS – 17923) in the crystalline structure. The compacted samples with 5 and 10 % of Nb₂O₅ were reduced to powder due to the characteristic volume expansion of zirconia caused by tetragonal to monoclinic phase transformation during the cooling.

B644 - IMPROVEMENTS ON SHAPE RECOVERING PROPERTIES THROUGH GRAIN SIZE REFINEMENT IN

Fe-Mn-Si-Cr-Ni-Co SHAPE MEMORY ALLOYS

Jorge Otubo (ITA), Fabiana Cristina Nascimento (Unicamp, UFPR) and Paulo Roberto Mei (Unicamp)

This work presents a process to improve the shape recovery properties in a stainless shape memory alloy (SMA) by austenitic grain size (GS) reduction. Three parameters were analyzed: shape recovering, elastic recovering and total shape recovering as a function GS and thermo-mechanical cycles treatment. Were analyzed samples with grain size between 75 and 129 microns. The increasing in the number of cycles had a positive effect for all GS studied improvements the shape recovery properties. We obtained 90% for total shape recovering after 5 training cycles in small grain size sample.

B645 - GRAIN SIZE EFFECT ON THE STRUCTURAL PARAMETERS OF THE STRESS INDUCED E-HCP-MARTENSITE IN IRON-BASED SHAPE MEMORY ALLOY

Lisandro Pavie Cardoso (Unicamp), Jorge Otubo (ITA), Fabiana Cristina Nascimento (Unicamp) and Paulo Roberto Mei (Unicamp)

This work presents a structural study of the martensitic phase (hexagonal structure, space group P63/mmc, $\gamma = 120^\circ$) in iron-based shape memory alloy (SMA). Austenitic grain size reduction promoted an increase of c/a ratio contributing for improvement in shape recovering properties. The sample small grain size presented 65% shape recovering at $c/a = 1.649$ after six training cycles. Structural parameters (lattice, c/a ration, unit cell volume and volume fraction of phases) were analyzed as a function grain size and number of training cycles using the Rietveld method.

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Lúcio Carlos Martins Pinto (CDTN/CNEN), Armino Santos (CDTN/CNEN), Wilmar Barbosa Ferraz (CDTN/CNEN), Margarida Márcia Fernandes Lima (CEFET-MG) and Ana Maria Matildes dos Santos (CDTN/CNEN)

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B597 - INCORPORATION OF BORON IN CVD DIAMOND FILMS THROUGH THE SUBSTRATE

Livia Elisabeth Brandão (UFRGS), Márcia Maria Lucchese (UFRGS), Naira Maria Balzaretta (UFRGS), Altair Sória Pereira (UFRGS) and João Alziro Jornada (INMETRO)

It was reported recently that diamond doped with a high boron (B) concentration is superconductor. Usually the doping of chemical vapor deposited (CVD) diamond with B is achieved by incorporating a B containing gas in the CVD process. We propose an alternative process where the CVD substrate consisting of graphite and B powders compacted under pressure, acts as the B source. The B incorporation was investigated by Raman spectroscopy, XRD, SEM and resistivity techniques. Although a high B concentration has been indicated in the film structure, the superconductor behavior was not detected.

B641 - CHEMICAL COMPOSITION MODIFICATION OF SINTERED PARTS BY CATHODIC SPUTTERING: EFFECT OF TEMPERATURE ON SURFACE ENRICHMENT WITH MO

Gisele Hammes (UFSC), Henrique Cezar Pavanati (UFSC), Cristiano Binder (UFSC), Roberto Binder (Embraco), Aloísio Nelmo Klein (UFSC) and José Daniel Biasoli de Mello (UFU)

Distinct molybdenum concentration profiles were obtained on sintered metal parts after sputtering in an abnormal electrical discharge using Mo as discharge cathode. The experiments were carried out in a glow discharge reactor with an electric auxiliary heating system, making it possible to vary the processing temperature maintaining the plasma parameters constants. It was observed that higher temperatures produced thicker enriched layers and that the molybdenum concentration decreases when the concentration drops below 4 wt%.