

Symposium C

POSTER SESSION PC1 - MONDAY, OCTOBER 9

C502 - EFFECT OF POLYSILOXANES ON THE PROPERTIES OF Al_2O_3 -Nb COMPOSITE MATERIAL PRODUCED BY PIROLISIS PROCESS

Wilson Acchar (UFRN), Ygor Alexandre Fonseca (UFRN) and Marcus Diniz (UFRN)

This work has investigated a ceramic composite material based in SiC_xO_y and Al_2O_3 reinforced with NbC. The use of polymer and reactive fillers to produce ceramic composite materials has the advantage to decrease the sintering temperature. Specimens were uniaxially pressed at 80 °C and pyrolyzed at 1200 and 1400 °C for two hours in an argon atmosphere. The results obtained in this work show that the use of polymethylsiloxane and the active fillers polymer method produces a ceramic composite material with better sintering behavior and properties as compared to others polymers materials.

C543 - ON THE PREPARATION METHODS AND MAGNETOCALORIC EFFECT OF THE $FeMnP_{0.45}As_{0.55}$ COMPOUND

Adenilson O. dos Santos (Unicamp), Adelino A. Coelho (Unicamp), Lisandro P. Cardoso (Unicamp), Sergio Gama (Unicamp), Alan Menezes (Unicamp), Luana Caron (Unicamp) and Ariana de Campos (Unicamp)

In this work we present the various methods used to prepare the magnetocaloric compound $FeMnP_{0.4}As_{0.55}$ aiming to optimize its magnetocaloric properties as well as the preparation method per se. Two main methods were attempted: one that melts the compound and another that obtains the compound through a solid state reaction started in a high-energy mill followed by a series of heat-treatments. Using a combination of techniques entropy variations as high as 16J/kgK at room temperature were obtained in a considerable range of temperature, suitable for magnetic refrigeration applications.

C564 - STRUCTURE AND RESIDUAL PROPERTIES FOR NORMAL STRENGTH AND HIGH-PERFORMANCE CONCRETES SUBMITTED TO TEMPERATURES UP TO 600°C

Evandro Tolentino (UnilesteMG) and Wander Luiz Vasconcelos (UFMG)

This research explores the relationship between residual modulus of elasticity, thermal conductivity and geometric parameters in normal strength and high-performance concretes, submitted to heat-treatments up to 600°C. The geometry of the structure was described using MIP and nitrogen sorption tests.

C571 - SYNTHESSES OF THE Cr_3Si , Cr_5Si_3 , $CrSi$, AND $CrSi_2$ BY MECHANICAL ALLOYING

Paulo Atsushi Suzuki (USP-Lorena), Daniela Aparecida Mardegan (UNIVAP), Thales Brazuna de Albulquerque (UNIVAP), Bruno Gonçalves de Oliveira (UNIVAP), Gilbert Silva (USP-Lorena) and Alfeu Saraiva Ramos (UNIVAP)

The route of solid-state powder processing known as mechanical alloying has been used to synthesize refractory compounds. The present work reports on the syntheses of the Cr_3Si , Cr_5Si_3 , $CrSi$, and $CrSi_2$ compounds by mechanical alloying. The following high purity starting powders were used to prepare the Cr-25Si, Cr-37.5Si, Cr-50Si, and Cr-66.6Si (at-%) powder mixtures: Cr (min 99.9 wt-%, irregular, < 120 mesh) and Si (99.999 wt-%, irregular, < 120 mesh). The milling process was performed under Ar atmosphere in a planetary Fritsch P-5 ball mill using silicon nitride balls (10mm diameter) and vials (225mL), rotary speed of 300rpm, and a ball-to-powder weight ratio of 20:1.

C573 - MECHANICAL RESPONSE TO NANO AND MICROSCALE PRECIPITATION DEVELOPED UPON HIGH-TEMPERATURE AGING IN A NICKEL BASED SUPERALLOY 59

Guillermo Solórzano (PUC-Rio), Erica Santana Nicoletti (PUC-Rio) and Fathi Darwish (PUC-Rio)

Alloy 59 exposed to high temperature effects can result, depending on the prevailing thermal conditions, in the precipitation of second phases, thus profoundly affecting the alloy properties. TEM observations and experimental mechanical tests conducted in this investigation have corroborated the effect of nano and micro-scale precipitates on the mechanical properties.

C505 - PRECIPITATION IN AISI 316L(N) AUSTENITIC STAINLESS STEEL DURING CREEP TESTS AT 550 AND 600°C FOR PERIODS OF UP TO 10 YEARS

Michael Rieth (FZK, Karlsruhe, Germany), Edeltraud Materna Morris (FZK, Karlsruhe, Germany), Doris Maribel Escriba (EPUSP), Angelo Fernando Padilha (EPUSP) and Mikhail Klimiankou (FZK, Karlsruhe, Germany)

Austenitic stainless steels of the type AISI 316L are widely used in components designed for high-temperature applications. Long-term exposure of this steel to high temperatures is known to cause the precipitation of several carbides types and intermetallic phases. The precipitation behaviour in 316L(N) steel samples (gauge portions and non-deformed heads) tested in creep at 550 and 600°C for periods of up to 85,000 hours has been studied. Three phases were detected: M23C6, sigma, and Laves phases. Two different mechanisms of sigma phase precipitation have been proposed.

C507 - STUDY OF CARBON REACTIVITY IN OXYGEN PLASMA USING MASS SPECTROMETRY

Aparecido dos Reis Coutinho (ITA), Rodrigo Sávio Pessoa (ITA), Choyu Otani (ITA), Alexei Mikhailovich Essiptchouk (ITA), Gilberto Petraconi Filho (ITA) and Gino Capobianco (ITA)

The objective of this work was to find out the best conditions for activation of carbonized macadamia nut shells using an oxygen Hollow Cathode Discharge (HCD). having in mind the applicability of the resultant porous carbon material as molecular sieves for adsorbing molecules in gaseous phase. The

process parameters temperature (200 to 800 °C) and time (1 to 50 min) were varied, while the chemical composition of plasma was being monitored by mass spectrometry technique. The analysis was focused to measure the relative concentration of species O, O₂, C, CO and CO₂.

C508 - TEMPERATURE JUMP EFFECT OF TESTING CARBON BASED MATERIALS UNDER ABLATIVE CONDITIONS

Aray Marotta (UNICAMP), Homero Santiago Maciel (ITA), Choyu Otani (ITA), Alexei Mikhailovich Essiptchouk (UNICAMP), Gilberto Petraconi Filho (ITA) and Iglia Spassovska (UNICAMP)

The study of the ablation properties and of microstructural behavior of carbon based materials under ablative conditions of plasma jet are presented. It was observed that during the test a sudden and unexpected jump of the surface temperature occurs before its saturation on constant level, while the mass loss per unit area is approximately proportional to the exposure time and depends strongly on the temperature of material surface.

C509 - 9Cr-MO STEEL CREEP-RUPTURE DATA EXTRAPOLATION

Mauricio Barreto Lisboa (CEPEL), Robert Peace (MCS), Luiz Henrique Almeida (COPPE/UFRJ), Iain Le May (MCS), Heloisa Cunha Furtado (CEPEL), Glaucio Rigueira (CEPEL) and Bruno Reis Cardoso (CEPEL)

9Cr-1Mo ferritic steels are used in applications that involve exposure to high temperature where creep and corrosion resistance are required. Their mechanical properties degrade over extended time as a function of service temperature and applied stress. The principal degradation mechanism in these applications is creep. The object of the present paper is to study the degradation of 9Cr-1Mo steel used in thermal generating plants, in order to predict residual life. Accelerated creep tests were made, and subsequently the test specimens were analyzed by hardness tests, light microscopy and TEM.

C510 - STRUCTURAL AND MAGNETIC PROPERTIES OF Fe_{2+x}Cr_{1-x}AL ALLOYS

In this research we use the transition elements of the iron group, and in this work present the obtained results for the iron alloys. The samples were made by arc melting several times under argon atmosphere the nominal mixtures of the constituents, which were then annealed for 3 days at 1000° C in argon filled quartz ampoules. For the XRD analysis thin disks were cut out from the central part of each button.

C512 - INVESTIGATION OF PLASMATRON OPERATION AND PERFORMANCE DURING ABLATION PROCESS OF MATERIALS USED FOR THERMAL PROTECTION SYSTEMS OF SPACE VEHICLES

Leonid Ivanovich Charakhovski (Unicamp), Sonia Fonseca Costa (ITA), Maria Luisa Gregori (ITA), Homero Santiago Maciel (ITA), Choyu Otani (ITA), Edson de Aquino Barros (ITA), Alexei Mikhailovich Essiptchouk (ITA), Gilberto Petraconi filho (ITA) and Aray Marotta (Unicamp)

This work presents the initial studies carried out in materials used as thermal protection systems (TPS) in reentry atmospheric vehicles and

in rocket nozzles. Problems under investigation include plasma flow, temperature and heat flux measurements and testing of ablative materials: cork, quartz and carbon. The last two are with phenolic resin composites. The experiments were carried out in an ambient atmosphere with a DC arc system used as reactive plasma source with gas enthalpies comparable to those encountered during atmospheric reentry.

C513 - PRODUCTION AND CHARACTERIZATION OF ZIRCALOY-TA ALLOYS

Alain Robin (EEL-USP), Carlos Alberto Baldan (EEL-USP), Carlos Angelo Nunes (EEL-USP), Gilberto Carvalho Coelho (EEL-USP) and Erico de Abreu Gomes (EEL-USP)

The production of nuclear grade Zircaloy 4-Ta alloys may constitute a possible route to prevent any utilization of Zircaloy scraps for nuclear applications but allowing their use in chemical processing industry. In this work, Zircaloy-10 and 50 wt% Ta were produced from Zircaloy 4 scraps and CP-Ta sheets by arc-melting. The alloys were hot-rolled at 900°C (as-rolled) and heat-treated at 700 or 1200°C (RHT700 and RHT1200). The microstructure of the as-cast, as-rolled, RHT700 and RHT1200 coupons was analyzed by SEM and XRD. Corrosion tests in boiling concentrated H2SO4 solutions were performed.

C514 - DYNAMIC STRAIN AGING EFFECT ON THE FIRE RESISTANCE OF A STRUCTURAL STEEL

Ronaldo Antônio Neves Marques Barbosa (UFMG), Cynthia Serra Batista Castro (UFMG) and Berenice Mendonça Gonzalez (UFMG)

The influence of dynamic strain aging (DSA) on the high temperature resistance of a fire resistant steel was investigated by means of tensile tests performed at different temperatures and strain rates. In this steel the DSA effects have approximately the same intensity as for carbon steels but took place at higher temperatures. The values of the activation energies for DSA manifestations is higher compared to those obtained for carbon steels. Results indicated that, besides other mechanisms, DSA apport an important contribution to the fire resistance of the steel.

C519 - PITTING CORROSION OF MARTENSITIC STAINLESS STEEL

João Paulo Murolo (USF), Eloy Strobel (USF), Neide Aparecida Mariano (USF) and Victor Ferrinho Pereira (USF)

The sector of equipment production and installation for the oil drilling industry have been making increasingly use of martensitic stainless steels because of their good combination of mechanical properties and corrosion resistance. These materials are becoming a practical and economical alternative to substitute carbon steels and part of stainless ones as a flowing line in the petroleum industry. The present work studies the pitting corrosion of martensitic stainless steel and the corrosion behavior was evaluated by electrochemical methods.

C520 - WELDABILITY OF THE NEW GENERATION OF FERRITIC STEELS Cr-W HIGH TEMPERATURE RESISTANT

Luiz Henrique De Almeida (Coppe), Bruno Rocha Cunha (Coppe), Mauricio Barreto Lisboa (Cepel) and Wagner Ferreira Lima (Cepel)

The efficiency of Petrochemical Plants components is limited by conventional Cr-Mo steels properties. These steels present a considerable creep resistance loss when they are used at temperature and pressure exceeding 550 °C and 22 MPa. The current perspective for increase of operation resides in utilize a new generation of alloys, the Cr-W ferritic steels. The Y-groove tests for the lower carbon bainitic type 2.25Cr-1.6W imply that it is immune to cold cracking when welded without preheat, and this benefit can be exploited for welding boiler waterwalls and for superheater tubes.

C521 - THERMAL AND STRUCTURAL CHARACTERIZATION OF RED CERAMICS FROM THE NORTHERN REGION OF RIO DE JANEIRO STATE

Francisco de Assis Léo Machado (UENF-LCFIS), Helion Vargas (UENF-LCFIS), Roberto da Trindade Faria Jr. (UENF-LCFIS), José Nilson França de Holanda (UENF-LAMAV), Rosane Toledo (UENF-LCFIS) and Leonardo Mota de Oliveira (UENF-LCFIS)

Ceramic samples are produced at different temperatures. Structural (X-ray diffraction) and the whole thermal properties are measured. The photothermal techniques are used in order to proceed the material thermal characterisation. Results are shown and discussed. It is proved that thermal diffusivity is quite consistent with the material structure.

C522 - A BETTER MICROSTRUCTURAL CONDITION FOR HIGH ELONGATION IN A SAF2205 DUPLEX STAINLESS STEEL

Levi de Oliveira Bueno (UFSCar) and Paulo Guanabara Júnior (UFSCar)

Different processing routes were used to examine the effect of different thermo-mechanical treatment conditions on superplastic behaviour, for solution treated and quenched SAF 2205 duplex stainless steel. Recrystallization and grain growth of the cold worked material were followed during iso-thermal treatments to determine a fine grained microstructure suitable for high elongation during hot tensile testing.

C523 - DENITRIDING AND RECRYSTALLIZATION IN FERRITIC STAINLESS STEEL

Mário Lúcio Talarico (CETEC), Nilton Lucinda Oliveira (CETEC) and Margareth Splanger Andrade (CETEC)

AISI 430 ferritic stainless steels are duplex at high temperatures, showing a mixture of austenite and ferrite. Hot rolling simulations by torsion tests were performed to investigate how austenite and ferrite soften during and after hot deformation. Denitriding of the samples was observed, under argon atmosphere, and caused reduction of the volumetric fraction of austenite and easier recrystallization in the regions with microstructure predominantly ferritic. Different mixtures of gases were tested and the best mixture found to prevent denitriding was composed of 15% Nitrogênio/85% Argônio.

C537 - LOW TEMPERATURE ELECTROSYNTHESIS OF MOLYBDENUM CARBIDE

Antonio Fernando Sartori (EEL-USP)

Molybdenum carbide has been electrolytically synthesized at 800°C from melts containing FLINAK with additions of K₂CO₃ and Na₂MoO₄.

Carbide formation was possible on nickel substrates with different C/Mo concentration ratio. Applied potentials in the range -0,5 to -0,8 V or current densities from 70 to 100 mAcm⁻² produced a dense and coherent deposits of the alpha phase of Mo₂C.

C544 - ON THE REVERSE STRAIN INDUCED MARTENSITIC TRANSFORMATIONS

Ana Luisa de Resende Castro (CETEC), Tiago Felipe de Abreu Santos (REDEMAT/CETEC) and Margareth Spangler Andrade (CETEC)

In the past decades many investigations were performed in order to identify the characteristic microstructure of low carbon microalloyed steels, which consist of a complex mixture of bainite, martensite, pearlite, ferrite and a MA constituent (martensite and retained austenite). In the present work atomic force microscopy analysis was performed in a Nb microalloyed steel submitted to different heat treatments to induce distinct microstructures. The results were compared to optical microscopy analysis. It was shown that the AFM technique is useful to identify different phases in steels.

POSTER SESSION PC2 - TUESDAY, OCTOBER 10

C525 - INTERMETALLICS COMPOUNDS FORMATION IN BRAZING FILETS BETWEEN METALLIZED ALUMINA WITH Ti AND Nb METALLIC/KOVAR

Osmar Roberto Bagnato (LNLS), Fernanda Regina Francisco (LNLS) and Guadalupe Malaise (Instituto Sabato)

This work aims the study of intermetallics in brazing fillets between Nb and kovar (Ni 29%, Co 17% and Fe balance) with metallized alumina. Three filler metals were used under different temperatures of annealing during 24 hours. The thermal treatments produce microstructure alterations, producing either the eutectic structure coalescence of the brazing fillet or increasing the precipitate size. Unions containing Nb/(Ag72%,Cu 28%) have not formed intermetallics. The ones with kovar have presented the compounds even before the thermal treatments, independently from the used metals of addition.

C531 - D.C. CONDUCTIVITY DEVELOPMENT AT HIGH TEMPERATURE IN SODIUM NIOBATE

Marcos Augusto de Lima Nobre (FCT - UNESP), Gabriel Mamoru Marques Shinohara (FCT - UNESP) and Sylvania Lanfredi (FCT - UNESP)

The electric and dielectrical relaxation phenomenon of the sodium niobate ceramic is analyzed at high temperature, using the impedance spectroscopy technique. The normalized M''/M''_{max} parameter as a function of logarithmic frequency at several temperatures showed a maximum value at each temperature. Based on the frequency range that contains peaks, there is evidence of the transition from a short-range to a long-range conductivity at decreasing frequency. The enhancement of d.c. conductivity is correlated to the decreasing of disorder niobium degree and cubic structure development.

C532 - HIGH TEMPERATURE PHASE TRANSITION PHENOMENON IN LITHIUM NIOBATE

Marcos Augusto de Lima Nobre (FCT - UNESP), Wellington

Alves (FCT - UNESP) and Sylvania Lanfredi (FCT - UNESP)

The electrical behavior of the LiNbO₃ ceramic was investigated by impedance spectroscopy. Electric conductivity and the master curve of the conductivity behavior is analyzed. Phase transition is identified in the temperature range from 500 to 600 °C. At temperatures higher than 600 °C a mismatch in the master curve can be observed. This suggests some structural change, where the phase transition is of order-disorder type leading to some kind of defect annihilation as dissociation of defect cluster.

C538 - PREPARATION OF NANOTUBES ON DOPED CERAMIC NANOPARTICLES

Ricardo Carlos Ferreira Alves Santos (UFS), Irene Teresinha Santos Garcia (UPEL), Neftali Lenin Villarreal Carreño (UFPEL), Edson Roberto Leite (UFSCAR), Elson Longo (UNESP) and Leidne Sylse Souza de Mello Carreño (UFS)

Tin and Magnesium oxide nanocomposites doped with rare earths as well as undoped oxides, were prepared by mechanical milling, using high-energy attrition. In catalytic decomposition natural gas revealed significant influence of the mechanical processing and chemical composition these compounds on their stability and coking resistance (formation of graphitic carbon) was observed.

C540 - DESIGN, SIMULATION AND MANUFACTURING OF MICROCHANNELS FOR REACTION OF VOC'S

Eliphias Wagner Simões (EPUSP), Lilian Marques Silva (EPUSP), Roberto da Rocha Lima (IFUSP), Aleksander Tressino de carvalho (EPUSP) and Maria Lúcia Pereira da Silva (EPUSP)

A simple device was proposed, simulated and tested for removal of volatile organic compounds (VOC's) from air. Simulation of the device, a three-dimensional microchannel recovered with copper, showed better heat transfer using an internal heating system. Tests of structure heating efficiency and VOC removal showed, on best adsorption and decomposition conditions, that VOC's was adsorbed at 3.9 mg/cm² for n-hexane and 4.7 mg/cm² for 2-propanol and at least 5% of n-hexane could be decomposed to produce CO₂. Therefore, this simple device can be useful in the sample pretreatment of VOC's in air.

C541 - ATOMIC TRANSPORT IN LANTHANUM-ALUMINUM OXYNITRIDE FILMS ON SILICON INDUCED BY THERMAL ANNEALING

Leonardo Miotti (UFRGS), Leonardo Salvador (UFRGS), Karen Paz Bastos (UFRGS) and Israel Jacob Rabin Baumvol (UFRGS e UCS)

Recently, lanthanum based materials, namely lanthanum oxides and aluminates, have been proposed as possible gate dielectric for application in the next generations of MOSFET devices. Furthermore, several investigations indicated that nitrogen incorporation in high-k films, either during or after deposition improves the thermal stability of the film during thermal processing. In this work, we investigate atomic transport and chemical reactions that take place in lanthanum-aluminum oxynitride (LaAl_xO_yN_z) films on Si following rapid thermal annealing (RTA) in vacuum or oxidant atmospheres.

C545 - MICROSTRUCTURAL CHARACTERIZATION OF AS-CAST CR-B ALLOYS

João Carlos Jânio Gigolotti (EEL - USP), Vanessa Motta Chad (EEL - USP), Maria Ismênia Soderó Faria (EEL - USP), Gilberto Carvalho Coelho (EEL - USP), Carlos Angelo Nunes (EEL - USP) and Paulo Atsushi Suzuki (EEL - USP)

The present work report our results on the phase equilibria of the Cr-B system. The alloys were arc melted under argon atmosphere in a water-cooled copper crucible with non-consumable tungsten electrode and titanium getter. The alloys were characterized via scanning electron microscope in the back-scattered electron mode and X-ray diffraction. The phases in each sample were identified based on the JCPDS and simulated diffractions patterns obtained from the PCW program. In general, a good agreement was found between our data and those from the currently accepted Cr-B phase diagram.

C548 - EVALUATION OF THE ELECTROCHEMICAL BEHAVIOR OF THE NIOBIUM UNDER HYDROGEN CHARGING

Artem Pashchuk (UFPR), Haroldo de Araújo Ponte (UFPR) and Aleksandra Gouveia Santos gomes da Silva (UFPR)

The hydrogen embrittlement is one of the great problems found in the oil industry. Like this, for a possible use in the production of a new probe to monitor of this degradation type, the behavior of the niobium was evaluated under cyclical hydrogen charging. The evaluation method used techniques was cycles of open circuit potential (OCP) during 90min to determine the equilibrium potential, alternated with hydrogen charging. The results shown that niobium has that in a hydrogen probe made of niobium it will have reply around 20min, where appears a significant potential variation.

C549 - SYNTHESIS AND CHARACTERIZATION MGAL2O4 SPINEL BY POLYMERIC PRECURSORS

Leda Garcia Santos (UFPB), Geraldo Narciso Rocha (UFPA), José Roberto Zamian (UFPA), Luiz Kleber Souza (UFPA), Diego Coelho Leite (UFPA), Antonio Gouveia Souza (UFPB) and Carlos Emmerson Costa (UFPA)

The aim of this project is to synthesize MgAl₂O₄ in the spinel phase through the polymeric precursors method and coprecipitation process and characterized them morphologically, structurally and thermally. The confirmation of the formation of this composition in the spinel phase if give through the characterization techniques (EDX, X-ray, BET, IV, TDA and TG). The initial crystallization temperature of the MgAl₂O₄ spinel powder is 500 °C, conciliating with the increase of its cristallinity. The spinel was formed in accordance with the initial and objective pretensions of the authors.

C550 - SYNTHESIS AND CHARACTERIZATION OF PIGMENT OF Co_xZn_{1-x}Al₂O₄ BY POLYMERIC PRECURSOR

Leda Garcia Santos (UFPB), Geraldo Narciso Rocha (UFPA), José Roberto Zamian (UFPA), Diego Coelho Leite (UFPA), Luiz Kleber Souza (UFPA), Antonio Gouveia Souza (UFPB) and Carlos Emmerson Costa (UFPA)

In recent years, there has been increasing interest in the synthesis of ZnAl₂O₄ spinel type structures. The pigment Co_xZn_{1-x}Al₂O₄ was synthesized through the method of polymeric precursors. It was observed the thermal stability is reached to the temperature of 600°C. The DRX displayed that

with the increase of the calcinations temperature there was an increase in the crystallization too. The temperature needed to obtain a spinel structure for the $\text{Co}_x\text{Zn}_{1-x}\text{Al}_2\text{O}_4$ was 600°C. The IR spectra of the $\text{Co}_x\text{Zn}_{1-x}\text{Al}_2\text{O}_4$ shown in all cases, show metal-oxygen stretching frequencies in the range 500-900 cm^{-1} .

C554 - CHARACTERIZATION OF MORPHOLOGY OF HEAT-TREATED NEW MULTI-COMPONENT CAST IRON ALLOY BY SEM AND XEDS

Isaac Jamil Sayeg (EPUSP e IGc-USP), Wanderson Santana Silva (EPUSP), Hélio Goldenstein (EPUSP) and Mário Boccalini (IPT)

This research project aims to investigate the morphology and kinetics of the carbide decomposition reaction of ascast multi-component alloys, based on the model alloy $\text{Fe}_2\text{C}_5\text{V}_5\text{Cr}_5\text{Mo}_5\text{W}$ (% mass), using SEM and EDS analysis. Similar alloys are used as rolls for hot rolling mills due to its extremely high wear resistance at high temperatures. It solidifies with an austenite matrix (martensite after cooling) and a dispersion of hard eutectic carbides MC, M2C and traces of M7C3. Unlike high speed steel, where the M2C carbide decomposes into MC, M6C during heat treatment, in multicomponent alloy M2C carbide decomposes into MC, M6C and M7C3. The preliminary results shown are the extracted carbides morphologies and microanalysis results for as-cast eutectic carbides.

C557 - THERMAL DECOMPOSITION OF SUCROSE AT HIGH PRESSURE

João Alziro da Jornada (INMETRO), Naira Maria Balzaretta (UFRGS), Altair Soria Perreira (UFRGS) and Kelen Soares Trentin (UFRGS)

Thermal decomposition of sucrose at high pressure (7.7GPa) was investigated up to 1800°C. The samples were analyzed by Raman spectroscopy, X-ray diffraction and FTIR absorption. Nanometric size graphitic domains were formed at high temperatures, but the carbonization of sucrose was not complete even after processing at 7.7 GPa and 1800°C

C558 - INVESTIGATION OF RELAXOR BEHAVIOR IN THE Ti^{4+} MODIFIED PbNb_2O_6 SYSTEM USING THE FREQUENCY AND TIME DOMAIN METHOD

José de los Santos Guerra (UFSCar), Michel Venet (UFSCar), Fidel Guerrero (UFSCar; Univ de Oriente), Robert Luis Gonzalez (Universidade de Oriente), Ducinei Garcia (UFSCar) and Jose Antonio Eiras (UFSCar)

The relaxor behavior of the doped Ti^{4+} PbNb_2O_6 system is analyzed. The best obtained relaxation function, in the frequency domain, was a Cole-Cole distribution function. On the other hand, the relaxation function, in the time domain, was found to be a KWW function-type. The temperature dependence of the b and t parameters (characteristics of the KWW function) is shown. Two values of the activation energy suggest the existence of two different relaxation mechanisms, which may be interpret by the ion hopping within the crystalline lattice, from a site to another neighboring one

C560 - MGO-C REFRACTORY: INFLUENCE OF ANTIOXIDANTS (Al, MgAl_2O_4) ON THERMOMECHANICAL PROPERTIES

Saulo Roca Bragança (UFRGS), Julio Cestari Pureza (UFRGS), Álvaro Correia Lima (UFRGS) and Carlos Pérez Bergmann (UFRGS)

This work evaluates the thermomechanical properties of MgO-C refractory with the addition of aluminum and spinel MgAl_2O_4 antioxidants prepared at laboratory. Assays for the evaluation of thermal shock strength and oxidation resistance at 1100°C had been done. Chemical and mineralogical analyses were also done to verify the presence of carbon after heating. The results pointed out that antioxidants addition have improved the thermomechanical properties of the refractory materials.

C561 - STUDY OF THE CHARACTERISTICS AND PARAMETERS OF IRON DISSOLUTION ON BAUXITE FROM SANTA CATARINA

Humberto Gracher Riella (UFSC), Rodrigo Fregulia De Fáveri (UFSC), Thiago Fernandes de Aquino (UFSC) and Juan Altamirano Flores (UFRGS)

The present work shows the characteristics of Santa Catarina's bauxite as well the study of involved parameters in iron dissolution contained in the ore. The objective of the work is the reduction of iron content, making possible the use of this ore as raw material for refractories. The bauxite is a raw material of great importance in the Brazilian and world-wide market, because it is used not only in the metallic aluminum manufacture, but also in the production of refractory materials.

C562 - COMPOSITES CHARACTERIZATION BACTERIAL-CELLULOSE AND POLY(URETHANE) RESIN

Younés Messadeq (Unesp - Instituto Química), Wagner Luiz Polito (USP - Instituto Química), Ademir Francisco Santos (Unesp - Instituto Química), Elaine Ruzgus Pereira Pinto (Unesp - Instituto Química) and Sidney José Lima Ribeiro (Unesp - Instituto Química)

This paper describes the experiments carried out with the main objective to prepare Bacterial Cellulose-Poly(urethane) composites. The Bacterial-Cellulose(BC) was obtained by a bacterian fermentation process (Acetobacter xilinum). It is free of lignin, hemicelluloses and presents greater molar mass and bigger degree of crystallization than those obtained in woods. A monocomponent PU material (one shot resin) was applied on the lyophilized BC surface. The previous characterization was performed using TG-DTA and Diffraction Ray-X and the results suggest a chemical interaction cellulose-resin.

C565 - EFFECT OF NITROGEN ON ANELASTIC PROPERTIES OF Nb-1.0wt%Zr ALLOYS

Carlos Roberto Grandini (UNESP/Bauru), Armando Cirilo de Souza (UEMS) and Odila Florêncio (UFSCar)

The mechanical properties of metals with bcc structure, such as niobium and their alloys, have significantly changed with the introduction of heavy interstitial elements. These interstitial elements (nitrogen, for example), presented in the metallic matrix, occupy octahedral sites and constitute an elastic dipole of tetragonal symmetry and might produce anelastic relaxation. This work presents the effect of nitrogen on anelastic properties of Nb-1.0wt%Zr alloys, measured by means of mechanical spectroscopy and the use of a torsion pendulum.

C575 - DEVELOPMENT OF METHODOLOGY AND FACILITIES FOR ASSESSING THE EFFECT OF OXIDATION ON CREEP TESTING RESULTS

Levi de Oliveira Bueno (DEMa / UFSCar)

A procedure for determining the effect of oxidation on creep testing results using the Theta-Methodology approach was recently proposed. Preliminary simulations with the model produced encouraging results. Experimental facilities are under development to validate the methodology using type 2.25Cr-1Mo ferritic steel.

C576 - CREEP BEHAVIOUR OF TYPE 310 STAINLESS STEEL . PART 1: PARAMETERS FROM THE NORTON, ARRHENIUS AND MONKMAN-GRANT RELATIONS

Levi de Oliveira Bueno (DEMa / UFSCar) and Archimedes Contin Jr. (DEMa / UFSCar)

The creep behaviour of Type 310 stainless steel is studied basically at 700°C using constant stress tests, in the stress range from 70 to 375 MPa. Continuous tests (without interruption) until rupture were programmed and also tests with small temperature or stress increments/decrements performed during the so-called secondary creep stage. Classical parameters were derived from the Norton, Arrhenius and Monkman-Grant relations and the participation of possible creep mechanisms discussed. The variation of the stress exponent (n value) with strain in primary and tertiary stages was also explored.

C577 - CREEP BEHAVIOUR OF TYPE 310 STAINLESS STEEL. PART 2: ANALYSIS BASED ON THE STUDY OF TRANSIENTS AFTER STRESS REDUCTION EXPERIMENTS

Archimedes Contin Jr. (DEMa / UFSCar) and Levi de Oliveira Bueno (DEMa / UFSCar)

An analysis of creep transients after small cumulative stress reductions is presented for Type 310 stainless steel as continuation of the work presented in Part 1. The reductions were made during the apparent secondary stage at 700 °C, in the stress range from 70 to 210 MPa. An analysis based on the dislocation network recovery kinetics was applied to determine the level of internal stress at the various stress levels. Creep strain rates expressed in terms of the effective stresses exhibit a single stress exponent close to 3 instead of the two n values mentioned in Part 1 of this work.

C579 - ROTATING FORGING OF COMMERCIALY PURE NIOBIUM

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The pure Niobium casting in electronic beam oven and recrystallized was used, in this work. The results of the microhardness, structural development, tensile tests of Niobium rotating forged have been investigated. The properties of hardness and tensile strength of the deformed niobium samples had shown a good improvement.