

Symposium L

POSTER SESSION PL1- WEDNESDAY, OCTOBER 11

L501 - FAILURE ANALYSIS OF STAINLESS STEEL PIPES FROM A FLOATING PRODUCTION STORAGE

Ana Rosa Martins (PUC-Rio) and Ana Cristina Vidal (PUC-Rio)

Several type 316L stainless steel pipes leaked unexpectedly during a performance test, while some others failed in service. The stainless steel pipes had been in operation for 1 year in a floating production storage and off-loading unit (FPSO), and was exposed to marine atmospheres. Visual examination and EDS analysis were carried out in the pipe samples. The results strongly evidenced the participation of sulfide, as well as chloride ions in the corrosive process.

L505 - INFLUENCE OF SURFACE TREATMENT ON CORROSION RESISTENCE OF TITANIUM FOR DENTAL IMPLANTS APPLICATIONS IN FLUORIDE SOLUTIONS

Carlos Nelson Elias (IME), Tania Maria Cavalcanti Nogueira (UFF), Fábio de Souza (UFF) and Norman Duque Penedo (UFF)

In this work the corrosion resistance of titanium for dental implants was studied in NaCl solutions containing NaF after two surface treatments: acid attack and mechanical polishing. Anodic voltammetries and scanning electron microscopy were carried out. The voltammetries in pH 2.0 solutions of the samples submitted to acid attack showed the appearance of pit corrosion at high potentials. The samples submitted to polishing treatment remained passivated. In the case of the pH 6.5 solutions a passivation process with the appearance of crystals on the surface of both samples were observed.

L509 - EFFECT OF GRAIN SHAPE ON MAGNETOSTRICTION OF POLYCRYSTALLINE Fe-Y

Reiko Sato Turtelli (TU-Wien), Claudio Teodoro dos Santos (USP-Lorena), Alex Reis Belarmino (USP-Lorena), Lucas Campos Teixeira (USP-Lorena), Cristina Bormio-Nunes (USP-Lorena) and Roland Groessinger (TU-Wien)

In the present work we look for $Fe_{100-x}Y_x$ ($Y = Ge, V$ and Ti) and $15 < x < 30$ alloys that present elongated grains associated with high magnetostriction I values. The grain structure was investigated by means of scanning electron microscopy (SEM)/backscattered electrons (BSE). Fe-Y ($Y = Ga, Ge$ and V). Fe-V sample reveals the most elongated grains. Fe-Y ($Y = Ga, Ge$ and V) samples have grain widths around 250 - 300 nm and Fe-Ti sample around 100 - 150 nm. $Fe_{80}Ga_{20}$ I_s measurements parallel to the long grains $I_s(//)$ is three times larger along the grain length, than those along the grain width.

L528 - DETERMINATION OF PHYSICAL HETEROGENEITY IN THE MICROSTRUCTURE OF A MODIFIED SAE 4118H STEEL BY COLOR ETCHING

Oswaldo Mitsuyuki Cintho (UEPG) and Selauc Vurobi Júnior (UEPG)

Some color etchants bring out crystallographic orientations of a structure by color and shading. In this case, a qualitative preliminary valuation of the grains orientation can be made by an optic microscopy technique, in a rapid manner and with a low expense for the industry segment. In this paper the general structure and the physical heterogeneity in the ferrite grains of a modified SAE 4118H steel in a normalized condition were disclosed by the metabisulfite-thiosulfate reagent. This steel is largely utilized in forging parts for the automotive industry, where isotropy is very essential.

L532 - MAPPING OF THE OXIDE FROM THE HOT ROLLING OF STAINLESS STEELS WITH THE USE OF MEV-EDS

Paulo César Luna (Acesita S.A) and Edson Hugo Rossi (Acesita S.A)

A chemical element mapping technique was developed and was used to analyze the oxide layer produced during hot rolling of stainless steels. The oxide composition through the thickness and along the length of the oxide layer was measured by the EDS technique in the SEM. The area to be analyzed is scanned according with a grid of points. The acquired data are then transported to an spreadsheet and distributed in coordinates X and Y, in order to convert the linear points again in a plan of chemical composition distribution, from which element distribution maps are plotted.

L536 - SEM CHARACTERIZATION OF UHMWPE RETRIEVED FROM KNEE PROSTHESES FAILURE REVISION

Dagoberto B. Santos (UFMG), Magda F. G. Rocha (UFMG) and Herman S. Mansur (UFMG)

The UHMWPE particulate matter that is produced as the result of articulation of these bearings with associated metal components can result in osteolysis of the surrounding bone. In this work we have characterized the microstructure of one oxidation UHMWPE retrieved after revision of total knee prostheses. Scanning Electron Microscopy coupled to EDX microprobe (SEM/EDX) was used for characterization the morphology and detected chemical elements presents. The results indicated that worn UHMWPE have presented different surface structure when compared to those without surface oxidation.

L539 - METALLOGRAPHIC CHARACTERIZATION OF MODIFIED SAE 4118H STEEL BY DIFFERENTIAL INTERFERENCE CONTRAST (DIC)

Selauc Vurobi Júnior (UEPG) and Oswaldo Mitsuyuki Cintho (UEPG)

The DIC system can be used as an alternative technique to identify topological height differences on a sample surface, by an optic microscopy technique, in a rapid manner and with a low expense for the industry segment. In this work the main objective is to bring out details in the general structure of a modified SAE 4118H steel, in a comparative way among DIC, SEM and optical techniques, after some heat treatments. This steel is largely utilized in parts for the automotive industry, where is very important to know its microstructures after the several heat treatments it can be submitted.

L540 - COMPOSITIONAL AND STRUCTURAL ANALYSIS OF LA(FEXSI1-X)13 USING EPMA AND XRD

Sérgio Gama (UNICAMP), Aba Israel Cohen Persiano (UFMG), Daniel Leandro Rocco (UNICAMP) and Pierre Louis de Assis (UFMG)

Magnetocaloric materials constitute the newest generation of solid state refrigerating systems, and among the most promising compounds is the La(FexSi1-x)13 family. Though La(FexSi1-x)13 intermetallic compounds were first studied in the early 1980's and much is known about their magnetic behaviour, little has been done in terms of chemical and morphological microanalysis. Motivated by possible commercial applications, this work uses both EPMA and XRD to study the relationship between processing conditions and the final phases obtained in samples with $x = 0.9$ and $x = 0.86$ nominal composition.

L541 - COMPARISON BETWEEN SLIDING WEAR BEHAVIOUR OF HARD METAL AND ALUMINA BALLS AGAINST (Ti,Al)N/WC-CO (HARD METAL SUBSTRATE)

Janaina Morais Kizzi, Tiago Cançado Souza and G.Cristina Durães Godoy

In this work it was realized a study about the possibility of occurrence of adhesion between the ball used in the sliding wear tests and the substrate of coated systems. This study put up some restrictions in the application of some coated cutting tools when they are driven into the some specific work material. In order to compare the sliding wear behavior of (Ti,Al)N coating deposited on "hard metal-WC/Co" substrate against alumina balls and "hard metal" balls, sliding wear tests were carried out. This investigation has showed the necessity for selecting the proper conditions for wear tests.

POSTER SESSION PL2- THURSDAY, OCTOBER 12

L502 - CHARACTERIZATION OF COMMERCIAL GLASS IONOMER CEMENTS BY SCANNING ELECTRON MICROSCOPY

Tais Munhoz (UFRJ) and Luiz Henrique de Almeida (UFRJ)

L503 - INFLUENCE OF THE MOLECULAR STRUCTURE OF REACTIVE COMPATIBILIZER ON THE MORPHOLOGY OF PBT/SAN/COMPATIBILIZER BLENDS

Edson Noriyuki Ito (PPG-CEM), Nelson Marcos Larocca (DEMa), Luiz Antonio Pessan (DEMa) and Elias Hage Jr. (DEMa)

Poly(butylene terephthalate) (PBT) and Poly(styrene-acrylonitrile) (SAN) blends are particularly interesting to study their reactive compatibilization by the methyl methacrylate-glycidyl methacrylate (MMA-GMA) copolymer. It was prepared PBT/SAN/MMA-GMA blends with low and high molecular weight MMA-GMA. It can be observed that the main difference between these two blends is the presence of tiny particles with a size of approximately 40nm dispersed among larger ones for the blend with low molecular weight MMA-GMA. It can be speculated that the tiny particles may be micelles formed by aggregates of graft copolymers PBT-g-MMA-GMA which were first formed at the PBT/SAN interface and subsequently dispersed in the PBT matrix.

L507 - SCANNING ELECTRON MICROSCOPY ASSOCIATED TO AN ELECTRON DISPERSIVE SPECTROSCOPY USED FOR THE STUDY OF PUNCTUAL DEFECTS IN GLAZED CERAMIC TILES

Anselmo Ortega Boschi (UFSCar) and Marcelo Dezena Cabrelon (UFSCar)

Defects and problems are a daily part of any professional involved with productive processes. What to do when they appear, however, is something that deserves to be discussed, mainly what is related to ceramic industry. The only effective way to eliminate the defects, also eliminating (or at least minimizing) the possibilities of reappearance, requires the identification of their causes and the actions that aim their elimination. Thus, the objective of this work is to show the Scanning Electronic Microscopy (SEM), associated to Electron Dispersive Spectroscopy (EDS), as a powerful tool for the

L511 - EVALUATION OF THE BIOFILM ON ALUMINUM SURFACE BY USING ATOMIC FORCE MICROSCOPY (AFM) TECHNIQUE

José Alexander de King Freire (UFC), Rui Carlos Barros da Silva (UECE), Ana Maria Amaral Silva (UECE) and Thiago de Melo Santiago (UFC)

Aluminum is a metal with applicability in many industries. Although it is a corrosion resistant metal, the literature is poor about the aluminum behavior in presence of bacteria and/or fungi. The aim of this work is to evaluate the biologic deposit grown on aluminum from medium with the fungus Aspergillus. The pH of the medium depends on the immersion time. This fact indicates that the changes happen due the OH⁻ ions. The fungus does not alter the process but increases it. The AFM images suggest that the film in contact with the medium may be significantly bigger than the area of the surface.

L513 - CVD DIAMOND FILM DEPOSITION ON Al-Si ALLOY EMPLOYED IN INTERNAL COMBUSTION ENGINE PISTONS

Carlos Alberto Junqueira Branco Júnior (UNESP - Guaratinguetá) and Teófilo Miguel de Souza (UNESP - Guaratinguetá)

Growth of diamond thin films by the Chemical Vapor Deposition using the hot filament reactor assisted technique introduces to the substrate low friction coefficients and high resistance to erosion, thus becoming a recommendable material for severe friction applications. A study has been carried out on CVD diamond film deposition on several materials, particularly the Al-Si based piston, which is most commonly, used type of pistons in internal combustion engines, to greatly improve its performance.

L520 - INVESTIGATION ON CARBON STEEL CORROSION IN THE PRESENCE OF SALMONELLA ANATUM IN SULFATE SOLUTION

Regine Helena Silva Vieira Fernandes (UFC), Tadeu Rocha Pontes Filho (UECE) and Rui Carlos Barros da Silva (UECE)

Microorganisms in aquatic media alter the metal/solution interface, accelerating the corrosion. The aim of this work was evaluate the carbon steel corrosion into sulfate solution in the presence of Salmonella anatum. For this purpose, immersion essay with mass loss, pH measurements of the solution and scanning electron microscopy and energy dispersive by X-rays analysis techniques were maintained. Bacterium affects the physical chemistry condition of the solution by changing the pH. The corrosion on

the surface is catalyzed. The biologic deposit film and pitting happen onto the surface.

L522 - MICROSTRUCTURAL CHARACTERIZATION OF BAMBOO AS RAW MATERIAL IN GREEN BUILDING

José Nivaldo Garcia (ESALQ/USP), Sérgio Luis Jesus (ESALQ/USP), Neusa Nogueira Lima (CENA/USP) and Cláudia Nogueira Lima (ESALQ/USP)

Various materials have been used in the civil construction in order to substitute those which demand high amount of energy to manufacture and bring damage to environment. Utilization of Dendrocalamus Giganteus bamboo species displays a material of low cost for traditional applications. Mechanical tests of compression, shear and hardness were applied to samples of bamboo and microstructure analysis were carried out using SEM/EDS. Results demonstrated the viability of application of D. Giganteus Bamboo and the feasible methodology of preparing part finished experimental pieces.

L523 - CALCIUM PHOSPHATE COATING ON POROUS ALUMINA SCAFFOLDS: MORPHOLOGICAL AND MECHANICAL ANALYSES

Herman Sander Mansur (UFMG), Marivalda Pereira (UFMG) and Hermes Souza Costa (UFMG)

Three different routes were used for the preparation of the alumina suspensions used for the fabrication of scaffolds. In two routes, suspensions of the 25wt.% of alumina powder A-01 were prepared in a mixture of 70% ethanol and 30% water. The results showed that well dispersed and fine particle size suspensions led to a successful replication and production of alumina scaffolds, with high interconnected porosity and the use of a CP/PVA suspension were able to create a Calcium Phosphate coatings on the surfaces of the porous alumina scaffolds, which may act as a bioactive layer.

L525 - THE MICROSTRUCTURE OF PORTLAND CEMENT MORTAR/PORCELAIN TILE INTERFACE

Herman Sander Mansur (UFMG) and Alexandra Piscitelli Mansur (UFMG)

A particular microstructure, different from the bulk one and similar to the interfacial transition zone (ITZ) between aggregates and cement paste, is expected developed at the interface between Portland cement mortars and ceramic tiles. This paper describes a microstructural investigation of this interface using Scanning Electron Microscopy coupled with Energy Dispersive Spectrometer microprobe. Based on the results, in the interface between Portland cement mortar and porcelain tiles was observed the formation of a duplex film (CH followed by C-S-H) in contact with the porcelain tile surface.

L527 - MICROSCOPY ANALYSIS OF BIOLOGIC INDICATORS EXPOSURE AT INDUCTIVELY COUPLED PLASMA PROCESS

Nelson Ordonez (LSI-EP-USP), Ronaldo Domingues Mansano (LSI-EP-USP), Michelle Rigamonte Boscarior (FCF-USP), Juliano de Moraes Ferreira Silva (FCF-USP), Débora Cristina de Oliveira (FCF-USP), Alexandre Marques Camponucci (LSI-EP-USP), Terezinha de Jesus Andreoli Pinto (FCF-USP) and Adir José Moreira (FCF-USP)

This study aimed to develop plasma sterilization techniques, using pure oxygen as process gas, taking into account the maximum microbial reduction versus short process times and high efficiency. To accomplish this hypothesis was used a high density plasma system. For the process characterization were used Bacillus subtilis var. niger ATCC 9372 as biological indicators inoculated in a load of 2x10⁷CFU per glass carrier of 18x18mm, which were exposed to pure oxygen plasma sterilization. Was conclude that high density plasma sterilization systems can be a good alternative to medical devices sterilization, especially taking into account the using of short periods of sterilization and non toxic gases

L534 - VALIDATION STUDY OF ELEMENTAL BROMINE (BR) QUANTIFICATION METHOD BY ENERGY DISPERSIVE SPECTROMETRY (EDS)

Antônio Tadeu Cristofolini (Embraco), Márcio Silverio (Embraco), Ricardo Tavares Araujo (Embraco) and Roberto Binder (Embraco)

Electron Probe Microanalysis (EPMA) by Energy Dispersive Spectrometry (EDS) was used to elemental bromine (Br) quantification in polymeric samples with emphasis in validation of methodology. Results were evaluated as accuracy and precision, where aspects of background correction and matrix effects were taken into account. Evaluation of method sensitivity and linearity were also accomplished, with the obtainment of limits of detection (DL) and quantification (QL), respectively. Selectivity was tested using samples which contained aluminum and results were correlated with those obtained by XRF.

L535 - THE SEM IMAGING ANALYSIS IN MORTAR USING I REJECT VIRGIN OF THE INDUSTRY THE CERAMIC FLOOR

Celso Aparecido Martins (UFSCar), Rorivaldo Camargo (LIEC/UFSCar), Juzélia Santos Costa (CEFETMT/UFSCar) and João Baptista Baldo (UFSCar)

In this work, the SEM imaging was used to follow the hydration products development of a masonry mortar, of recycled aggregates made from glazed floor tile in substitution of a regular masonry mortar made sand, lime and cement. The cure period extended to one year of age. Both mortars were prepared with the same proportions of components and cured under the same conditions. The results by from SEM imaging showed that there were no fundametal differences in hydration however the mortar containing the recycled aggregate experienced a higher degree of carbonation.

L542 - FRITS TO LEUCITE REINFORCED FELDSPAR GLASS- CERAMIC

Maria Cecilia Nobrega (Coppe), Adão Benvindo Luz (Cetem), Vinicius Bemfica Pinto (Coppe), Renata Nigri Almeida (Cetem), Carla Napoli Barbato (Cetem/Coppe), João Alves Sampaio (Cetem) and Tsuneharu Ogasawara (Coppe)

Glass-ceramics are fine grained polycrystalline materials formed when glasses of suitable compositions are sintered and thus undergo controlled crystallization/devitrification. The frits were melted at 1200oC for 3h, or at 1300oC (or 1400°C) for 2 hours. The frit powders were sinterezed at 1000°C. The leucite content sinterezed frit from melting carried out at 1200°C are smaller than the frit from higher melting temperatures. This fact can be explained because when the frit is melted at 1.200 C its structure is not completely amorphous showing microcrystals that work as seeds of

crystallization.

L543 - ULTRATHIN SECTIONING FOR VARIOUS RANGES OF PARTICLE SIZE IN HIGH-IMPACT POLYSTYRENES, HIPS

Vinicius Galhard Grassi (INNOVA S/A), Marcus Fernando Dal Pizzoli (INNOVA S/A), Leandro Gianluppi (ULBRA), Joao Claudio Sanchez Pocos (ULBRA) and Ester Schmidt Rieder (ULBRA)

Structural characterisation of composite-polymers, such as phase distribution, phase volume fraction and particle size of the second phase on the matrix, is fundamental to relate structure and properties. An insight into the structure of high-impact polystyrenes, HIPS, was performed using Transmission Electron Microscopy, TEM. This paper describes the remarkable relationship between sample thickness and polybutadiene (PB) particle size to obtain good TEM specimens. Specimens containing PB particle sizes ranging from 0,1 to 10 micrometer in diameter were addressed.
