

# Table of Contents

## Preface, Committees, Sponsors

## Chapter 1: Ceramic Materials in Mechanical Engineering

<b>Pure and Doped SrTiO<sub>3</sub> Powders Obtained by Ultrasonic Synthesis</b>	3
A.S. Chaves, O. de Andrade Raponi, M.V. Gelfuso and D. Thomazini	
<b>Effect of Strontium Doping on the Structural, Morphological, and Dielectric Properties of PZT Ceramics</b>	8
M.S. da Silva, R.G. Dias, E.F. de Souza, M. Cilense, M.A. Zaghete and A.A. Cavalheiro	
<b>Study on the Piezoelectric Behavior and Structural Changes of Strontium Doped PZT Ceramics</b>	13
M.S. da Silva, L.L. da Silva, E.F. de Souza, E. Longo, M.A. Zaghete and A.A. Cavalheiro	
<b>Structural and Microstructural Properties of Si-C and Si-C-B Powders Obtained by High-Energy Ball Milling</b>	19
L. Ferreira, D.S. Mégda, A.C. de Souza, R.F.C. Marques, E.C.T. Ramos, V.M. Chad and A.S. Ramos	
<b>Use of Statistical Techniques in the Optimization of the Process "Starch Consolidation"</b>	25
A.G. Storion, C. del Roveri, E. Ramalho Pinto, E.C.T. Ramos, P.N. Mendes and S.C. Maestrelli	
<b>Nondestructive Analysis of Bi<sub>2</sub>212 Bulk Superconducting Ceramics in the C-Axis Direction</b>	29
A.R. Bigansolli, T.G. da Cruz and D. Rodrigues Jr.	
<b>Synthesis, Characterization and Photoluminescent Properties of ZrO<sub>2</sub> Nanocrystals</b>	35
G. da Silva Sousa, L.S. Cavalcante, M.R.d.M.C. Santos and J.M.E. de Matos	
<b>Obtaining of Ceramic Sensor Devices for Soil Humidity Measurements in Different Climatic Conditions</b>	40
R.d.M. Oliveira, M.d.C.d.A. Nono and M.d.O. Couto	
<b>Comparative Analysis of Fracture Toughness Obtained by Different Techniques in Alumina Matrix - Dispersed TZP Zirconia Composites</b>	46
D.A. Nono, E. Fernandes da Silva, M.d.C.d.A. Nono, F.P. Neto and S.L. Mineiro	
<b>Harder and Denser AlN-TiB<sub>2</sub> Ceramic Composites Processed by Spark Plasma Sintering</b>	52
L.A.F. Peçanha Jr., L. Simão, A.L.D. Skury, M. Picanço Oliveira, L. Tedesco Bolzan and S.N. Monteiro	
<b>Effect of Boron and Carbon Addition on the Phase Transformations during High-Energy Ball Milling and Subsequent Sintering of Si<sub>3</sub>N<sub>4</sub>+B and Si<sub>3</sub>N<sub>4</sub>+C Powder Mixtures</b>	58
L.O. Vicentin Maruya, B.R. Baldone Lara, B.B. de Lima, V.M. Chad, G.C. Coelho and A.S. Ramos	
<b>Fracture Stress Analysis in Ceramic Composites of Alumina Matrix with Zirconia 3Y-TZP Nanograins for Mechanical Shielding of Satellites</b>	64
E. Fernandes da Silva, D.A. Nono, S.L. Mineiro, F.P. Neto and M.d.C.d.A. Nono	
<b>Synthesis and Sintering of LaCo<sub>1-X</sub>Fe<sub>X</sub>O<sub>3</sub> Ceramics: Microstructure Analysis</b>	69
G.R. Paula, D.V. Ribeiro and M.R. Morelli	
<b>Thermal Characterization of Neodymium-Barium-Copper Ceramic (NBCo Ceramic) Synthesized from Barium Carbonate</b>	74
J.P. Fernandes, A. Tibola, M. Lorensetti, G.W. Duarte, M.R. Rocha, O.K. Montedo, H.G. Riella and M.A. Fiori	
<b>Ga<sub>2</sub>O<sub>3</sub>-Doped ZnO-Nb<sub>2</sub>O<sub>5</sub>-TiO<sub>2</sub> Dielectric Resonators for Terrestrial and Space Telecommunications Applications</b>	79
M.d.C.d.A. Nono, P.J. Castro, E.G.L. Rangel and S.L. Mineiro	
<b>Rheological Behavior of Paraffin-Alumina Emulsions and their Microstructural Effects</b>	85
M.F. Sanches, N.M.D. Vitorino, J.C.d.C. Abrantes, J.R. Frade, J.B.R. Neto and D. Hotza	

## Chapter 2: Building Materials and Ceramics for Construction

<b>Evaluation of Sample Preparation Parameters in the Compressive Strength of Cementitious Composites</b>	
A.L. de Figueiredo Maia, N. Oliveira Sena, L.L.d.M.S. Oliveira, G. Melo Pereira, M.J. da Silva, D.S. Resende, J.T. da Silva Neto, M.T.P. de Aguilar and A.C. da Silva Bezerra	93
<b>A Study of the Mechanical Behavior of Concrete Using Additive and Waste Tires Rubber through a Diametral Compression Test Using Digital Image Correlation</b>	
F. Rosendo Sobrinho, F.A. da Silva Jr. and R.N. de Codes	98
<b>Determining the Content of Toxic Substances in Panels from Pruning <i>Acacia mangium</i> Willd</b>	
J.S. Nery de Souza, F.M. Barbosa, E.C. da Silva Filho, Y.K.L. Abreu, W.A. de Sousa, F.P. de Araújo, J.B. Guimarães Jr. and J.A. Osajima	102
<b>Hydration and Dehydration of High Initial Strength Portland Cement Type CP V - ARI</b>	
A.G. de Araújo Jr., L.J. da Silva, T.H. Panzera, A.G. da Souza Azevedo and K. Strecker	106
<b>A Study of the Chemical and Physical Characteristics of the Soils from the South of Piauí for Soil-Cement Brick Production</b>	
F.P. de Araújo, E.C. da Silva Filho, J.S. Nery de Souza, J.A. Osajima and M.B. Furtini	112
<b>Moisture Expansion during the Formation of Crystalline Phases in Clay/CaCO<sub>3</sub> Mixtures</b>	
R.A. Andrade, H.C. Ferreira, R.R. Menezes and G.A. Neves	116
<b>Evaluation of a Tacking Stage for Adherence, between Mortar and Ceramic Brick</b>	
A.R.G. de Azevedo, J. Alexandre, G. de Castro Xavier, E. Barnabé Zanelato, S.N. Monteiro, C. Bozzi Piazzarollo, T.O. Mendonça, F.C. Coelho França and F. de Oliveira Braga	121
<b>Factorial Design for 3<sup>2</sup> Experimental Planning of Clay Ceramic Incorporated with Ornamental Stone Waste</b>	
C. Bozzi Piazzarollo, G. de Castro Xavier, J. Alexandre, A.R.G. de Azevedo, C.M.F. Vieira, S.N. Monteiro and F. de Oliveira Braga	127
<b>Influence of Weather Exposure on Dimensional Changes in Clay Ceramics Incorporated with Granite Residue</b>	
J. Alexandre, A.R.G. de Azevedo, G. de Castro Xavier, F. Muylaert Margem, S.N. Monteiro, F. de Oliveira Braga, N.G. de Azeredo and C. Bozzi Piazzarollo	131
<b>Production Speed and its Influence on Hue Variation on Tiles Decoration Based on Silicon Cylinder Technique Laser Engraving Method</b>	
F. Ferraço, A.O. Boschi and A.G. Storion	136
<b>Influence of Reburning on the Pozolanicity of Sugar-Cane Bagasse Ashes with Different Characteristics</b>	
R.T.L. Ferreira, F.M.M.P. Nunes, A.C. da Silva Bezerra, R.B. Figueiredo, P.R. Cetlin and M.T.P. de Aguilar	141

### Chapter 3: Main and Recycled Materials for Ceramics Production

<b>Utilization of Foundry Waste to Produce Ceramic Matrix Composites</b>	
A.L. Rodriguez, É.V. Queiroz, D.A.R. López, T.B. Wermuth, T.M. Basegio and C.P. Bergmann	149
<b>Purification Route of Pyrite from Coal Mining</b>	
C. Machado de Oliveira, A. Oliveira, J.A. do Rosário, A. de Noni Jr. and M. Peterson	155
<b>Microstructural Characterization of Ornamental Rock Samples: Cariri Rocks</b>	
D. Lisbôa da Costa, I.M.M. Fernandes, A.N.S. Braga, R.M. da Costa Farias, R.R. Menezes and G.A. Neves	159
<b>Recycled Alumina Production from the Anodizing Industry to Tubulation Coating of Petroleum Craking</b>	
M.F. de Carvalho, A.G. de Sousa, R.A.S. Ferreira, A.H. Shinohara and Y.P. Yadava	164
<b>Synthesis of Ceramic Pigment Based on Crystal Structure of Wollastonite</b>	
M.V. Folgueras, G.B. Albuquerque and S.R. Prim	170
<b>Organofunctionalization of Natural Palygorskite with Ethylene Sulfide in the Absence of a Solvent</b>	
M.P. Silva, M.E.R. Oliveira, F.M.C. Batista, M.R.d.M.C. Santos, M.G. Fonseca and E.C. da Silva Filho	176
<b>Evaluation of the Potential of Using Quartzite Residue in Mass for the Production of Sanitary Ware</b>	
P.S.S. de Medeiros, L.N.L. Santana, V.J. Silva, G.A. Neves and H.L. Lira	181

<b>The Use of Dust Emission from Foundry Industry as Raw Material to the Industry of Ceramic Coating</b>		
F.R. Cúnico, M.V. Folgueras, T.J.B. Schmitt, R.L.P. Carnin and M.A.B. Bruno	186	
<b>Chemical-Mineralogical and Microscopic Characterization of Clay Used as Raw Materials in Santa Gertrudes' Ceramic Pole</b>		
C. del Roveri, R.A. Cunha, A. Zanardo, L.H. Godoy, M.M.T. Moreno, R.R. Rocha and S.C. Maestrelli	191	
<b>Beneficiation of Kaolins by Hydrocycloning</b>		
J.M.R. de Figueirêdo, P.L. de Oliveira, L.N.L. Santana, R.R. Menezes, G.A. Neves and H.C. Ferreira	195	

## Chapter 4: Composites and Polymers - Properties and Technologies

<b>Dynamic-Mechanical Performance of Sponge Gourd Fiber Reinforced Polyester Composites</b>		
V. Scarpini Cândido, M. Picanço Oliveira and S.N. Monteiro	203	
<b>Comparison between Rice Husk Ash and Commercial Silica as Filler in Polymeric Composites</b>		
I.J. Fernandes, D. Calheiro, E.C.A. dos Santos, R. Oliveira, T.L.A. de Campos Rocha and C.A.M. Moraes	209	
<b>Mechanical Analysis of Polybenzoxazine Matrix in Fiber Metal Laminates</b>		
C. Vilas Boas, F. Moreno and D.J. dos Santos	215	
<b>Tensile Behavior of Epoxy Composites Reinforced with Thinner Fibers of Sugarcane Bagasse</b>		
V. Scarpini Cândido and S.N. Monteiro	221	
<b>Charpy Toughness Behavior of Eucalyptus Fiber Reinforced Polyester Matrix Composites</b>		
A.d.P. Barbosa, F. Muylaert Margem, C.G. Oliveira, N. Tonini Simonassi, F. de Oliveira Braga and S.N. Monteiro	227	
<b>Chemical Treatment and Characterization of Fiber of Babassu Coconut Epicarp (<i>Orbignya phalerata</i>) for Application in Polymeric Composite</b>		
C.A.L. Fonteles, G.F. Brito, J.F. Reis Sobrinho, T.S. Alves and R. Barbosa	233	
<b>Composites Based on Thermoset Resin and <i>Orbignya phalerata</i> (Babassu Coconut): Evaluation of Mechanical Properties, Morphology and Water Sorption</b>		
C.A.L. Fonteles, G.F. Brito, L.H. Carvalho, T.S. Alves and R. Barbosa	237	
<b>Bending Mechanical Behavior of Epoxy Matrix Reinforced with Buriti Fiber</b>		
A.d.P. Barbosa, G.R. Altoé, R.L. Loiola, F. Muylaert Margem, F. de Oliveira Braga and S.N. Monteiro	243	
<b>Tensile Behavior of Epoxy Composites Reinforced with Thinner Sisal Fibers</b>		
L.A. Rohen, A.C. Cerqueira Neves, F. Muylaert Margem, C.M.F. Vieira, F. de Oliveira Braga and S.N. Monteiro	249	
<b>Under Pressure Processed Polyester Composites with High Amount of Curaua Fibers for Improved Tensile Properties</b>		
M.A. Barcelos, N. Tonini Simonassi, F. Muylaert Margem, F. de Oliveira Braga and S.N. Monteiro	255	
<b>Carnauba and Rhea Americana Eggshell Powder Incorporation in PHB Bionanocomposites</b>		
Y.C.d.N. Rocha, M.L. Sá, T.S. Alves, R. Barbosa, L.H. Carvalho and J.E. da Silva Neto	260	
<b>Evaluation of Biodegradability of a Compost Obtained from Polymeric Composite Reinforced Natural Fibers</b>		
M.J.F. de Araujo, M.V.F. de Araujo and D.R. Mulinari	265	
<b>Differential Scanning Calorimetry Tests of Epoxy and Polyester Composites Reinforced with Giant Bamboo Fibers</b>		
G. Oliveira Glória, Y.M. de Moraes, C.G.D. Ribeiro, L.B. de Souza Martins, F. Muylaert Margem, F. de Oliveira Braga and S.N. Monteiro	270	
<b>Development of Ni/h-BN Self-Lubricating Composite Powder by High-Energy Ball Milling</b>		
M.L. Parucker, C.E. da Costa and V.L. Soethe	277	
<b>Characterization by Fourier Transform Infrared (FTIR) Analysis for Natural Jute Fiber</b>		
I.L.A. da Silva, A.B. Bevitori, L.A. Rohen, F. Muylaert Margem, F. de Oliveira Braga and S.N. Monteiro	283	

<b>Study of the Degradability of PA6/Organoclay Nanocomposites</b>	288
T.C. de Carvalho, E.B. Bezerra, R.A. da Paz, A.M.D. Leite, V.d.N. Medeiros and E.M. Araújo	
<b>Effect of Molecular Weight of Polyamide 6 in Rheological Properties of Nanocomposites with Brazilian Organoclay</b>	293
R.A. da Paz, A.M.D. Leite, E.M. Araújo, T.J.A. Melo, L.A. Pessan and F.R. Passador	
<b>Evaluation of Biodegradation of PHB/PP-G-MA/Vermiculite Bionanocomposites</b>	298
P.J.P. Mesquita, R.d.J. Araújo, D.d.L.A.C.S. Andrade, L.H. Carvalho, T.S. Alves and R. Barbosa	
<b>Characterization of Bionanocomposites PHB, PEG and Organophilic Clay</b>	303
R.M. da Silva Jr., I.D. Conceição, J.E. da Silva Neto, T.S. Alves and R. Barbosa	
<b>Evaluation of Current in Composites PVAl/Ceramics for Detection of Leakage Current Generated in Electrical Insulators</b>	308
A.C.S. Costa Jr., P.C.F. Menezes, A.J.V. Andrade, T. Silva, E.G. Costa and A.C.F.M. Costa	
<b>Effects of 3-APTMS-Modified Nano-SiO<sub>2</sub> on the Mechanical Properties and Crystallization Behavior of Polyamide-6</b>	314
B.D. Queiroz, V.L.P. Janzanti and J.D. Ambrósio	
<b>Stress Cracking Analysis on Automotive Tubes Made with Polyamide 12</b>	320
R. Polkowski, P. Melo and L. Pisano	
<b>Mechanical Properties of Natural Fibers Reinforced Polymer Composites: Palm/Low Density Polyethylene</b>	326
J.R. Guedes, W.M. Florentino, L.M. Rodrigues, C. dos Santos and D.R. Mulinari	
<b>Characterization of Epoxy Matrix Reinforced with Banana Fibers Thermal Properties by Photoacoustic Technique</b>	331
F. Salgado de Assis, F. Muylaert Margem, P. Amoy Netto, R.d.T. Faria Jr., T.C. Cordeiro, F. de Oliveira Braga and S.N. Monteiro	
<b>Preparation and Characterization of Composites Obtained of Polymeric Waste Coming from Boards Electronic Equipment</b>	338
R.d.O. Magnago, D.R. Mulinari, M.P. do Amaral, L.M. Rodrigues and C. dos Santos	
<b>Effect of Hydrolytic Degradation on Mechanical Properties of PCL</b>	342
D.C. França, E.B. Bezerra, D.D.S. Morais, E.M. Araújo and R.M.R. Wellen	
<b>Changes in Molecular Weight of Poly(Styrenesulfonate) Initiated by Thioxanthone: Photolysis and Photo-Oxidation</b>	346
J.A. Osajima, C.C. Schmitt Cavalheiro and M.G. Neumann	
<b>Processing of Pet-Silver Nanocomposite Filaments</b>	350
M.A. Guerra, N.A. Mariano, A.S. Ramos and M.G.N. Campos	
<b>Study of Damage in the Medium Density Polyethylene Using Digital Image Correlation</b>	356
L.F. dos Santos, R.N. de Codes, E.N. Silva and R.A. de Codes	
<b>Tensile Test of High Strength Thinner Curaua Fiber Reinforced Polyester Matrix Composite</b>	361
S.N. Monteiro, F. Muylaert Margem, N. Tonini Simonassi, R.L. Loiola and M. Picanço Oliveira	
<b>Influence of Graphite Powder and Carbon Black Weight Percentages on the Electrical Properties of Epoxy Composite Plates</b>	366
S. de Abreu Martins, J.M. Reis and H. da Costa Mattos	
<b>Pullout Tests Behavior of Polyester Matrix Reinforced with Malva Fiber</b>	371
J.I. Margem, V. Alves Gomes, F. Muylaert Margem, C.G.D. Ribeiro, F. de Oliveira Braga and S.N. Monteiro	
<b>Correlation between the Density and the Diameter of Fique Fibers</b>	377
P. Amoy Netto, G.R. Altoé, F. Muylaert Margem, F. de Oliveira Braga, S.N. Monteiro and J.I. Margem	
<b>Density Weibull Analysis of Pineapple Leaf Fibers (PALF) with Different Diameters</b>	384
G. Oliveira Glória, G.R. Altoé, P. Amoy Netto, F. Muylaert Margem, F. de Oliveira Braga and S.N. Monteiro	
<b>Fabrication of Polypyrrole Nanoparticles Using Microemulsion Polymerization for Diferent Py/APS/SDS Molar Ratios</b>	391
R.H. Santim, H.A. de Aquino and J.A. Malmonge	
<b>Effect of the Fiber Equivalent Diameter on the Elastic Modulus of Eucalyptus Fibers</b>	396
A.d.P. Barbosa, F. Muylaert Margem, S.N. Monteiro, C.G. Oliveira and N. Tonini Simonassi	

## **Chapter 5: Steel, Alloys and Special Metals - Properties, Technologies of Production and Processing**

<b>Influence of Martensitic Transformation on the Fatigue of Low Temperature Metastable Stainless Steel</b>	
S.N. Monteiro, V. Scarpini Cândido, L.C. da Silva and F. Muylaert Margem	405
<b>Evaluation of Martensite Fraction in 1026 Steel by Infrared Thermography Combined with the Koistinen-Marburger Model</b>	
D.V. Bubnoff, M.M.O. Carvalho, C.R. Xavier, G.S. da Fonseca and J.A. de Castro	411
<b>Application of Computational Thermodynamics to the Evolution of Surface Tension and Gibbs-Thomson Coefficient during Multicomponent Aluminum Alloy Solidification</b>	
P.A.D. Jácome, M.T. Fernandes, A. Garcia, A.F. Ferreira, J.A. de Castro and I.L. Ferreira	416
<b>Formation of Ni<sub>3</sub>Ta, Ni<sub>2</sub>Ta and NiTa by High-Energy Ball Milling and Subsequent Heat Treatment</b>	
H.S. Nunes Benites, B.P. da Silva, A.A.A. Pinto da Silva, B.B. de Lima, G.C. Coelho and A.S. Ramos	423
<b>Analysis of the Microstructural Evolution during the Transient Upward, Downward and Horizontal Directional Solidification of the Al-1.2wt%Pb Monotectic Alloy</b>	
C.Y.N. Konno, A.J. Vasconcelos, A.S. Barros, A.P. Silva, O.F.L. da Rocha, A. Garcia and J.E. Spinelli	429
<b>Static Aging Behavior of Microalloyed Wire Steel and Carbon Wire Steel</b>	
F.F. David, S.F. David, L. Lira Silveira and R.A.S. Ferreira	435
<b>Friction Stir Welding of Aluminium Alloy Sheets</b>	
N.L. Vale, J.F. Dos Santos, I.R. Melo, O.O. Araújo Filho and S.L. Urtiga Filho	441
<b>Manufacturing and Characterization of AA1100 Aluminum Alloy Metal Matrix Composites Reinforced by Silicon Carbide and Alumina Processed by Powder Metallurgy</b>	
O.O. Araújo Filho, A.D. Araújo de Moura, E.R. de Araújo, M.J. dos Santos, C.H. Gonzalez and F.J. da Silva	447
<b>Thermal Parameters, Tertiary Dendritic Growth and Microhardness of Directionally Solidified Al-3wt%Cu Alloy</b>	
A.S. Barros, M.A.P. de Souza da Silva, O.F.L. da Rocha and A.L. Moreira	452
<b>Pulsed Nd:YAG Laser Welding of UNS S 32205 Duplex Stainless Steel</b>	
G.d.S. Crespo, J.L. Padilha, C.R. Sokei, R.C. Tokimatsu, J. Gallego and V.A. Ventrella	458
<b>Crystallization of Amorphous Cu<sub>49.7</sub>Ti<sub>31.8</sub>Zr<sub>11.3</sub>Ni<sub>7.2</sub> Alloy</b>	
C. Triveño Rios and R. Contieri	464
<b>Effect of Corrosion of Stainless Steel Welded within Lithium Chloride</b>	
J.N. Pereira, D.M. Macêdo Dias, N.N. Regone, M.A. Fernandes, S. Nakamatsu, S.C. Maestrelli and N.A. Mariano	470
<b>Influence of Heat Treatment on Martensitic Transformations in Copper-Based Alloys with Shape Memory Effect</b>	
L.C. Sekitani da Silva, C.H. Gonzalez, C.A. do Nascimento Oliveira and K.C.A. da Silva	474
<b>Microstructural Characterization of Joints of Maraging 300 Steel Welded by Laser and Subjected to Plasma Nitriding Treatment</b>	
S. Lombardo, R. Nascimento Ferreira, L.A. de Souza Santos, J.W. de Jesus Silva, V.H. Bagio Scheid and A.J. Abdalla	479
<b>Sintered Nickel Casing for Irradiation Targets</b>	
R.S.L. Miyano, H. Takiishi, E.P. Soares, A.M. Saliba-Silva and J.L. Rossi	484
<b>Strain-Induced Martensite Formation of AISI 304L Steel Sheet: Experiments and Modeling</b>	
D.C.T. Costa, M.C. Cardoso, G.S. da Fonseca, L.P. Moreira, M. Martiny and S. Mercier	490
<b>Mechanical Behavior and Structural Analysis of a TiNi Alloy Annealed in the 300 to 500°C Range and Air Cooled</b>	
L.A. Matlakhova, E.M.R. Pessanha and E.A. de Carvalho	497
<b>Study of Fatigue in AISI 4340 Steel with Different Microstructural Conditions, Submitted to a Surface Treatment of Shot Peening</b>	
C.E. Molento de Moraes, C.A.R.P. Baptista, M.A. dos Santos Torres, M.d.P.C. Fonseca and A.J. Abdalla	503
<b>The Effect of Phase Transformation on the Tensile Fracture of Austenitic Stainless Steel</b>	
V. Scarpini Cândido and S.N. Monteiro	508

<b>Evaluation of Cracking Susceptibility of Weldment Container for Nuclear Power Plant</b>	514
S.N. Monteiro, L. Tedesco Bolzan and F. Muylaert Margem	
<b>Fracture Behavior of 316 Stainless Steel under Creep at 600 and 800°C</b>	520
S.N. Monteiro, F. Muylaert Margem, F. de Oliveira Braga and L.H.L. Louro	
<b>Study of Aluminum Alloy 7050 T7451 Isotropic Hardening</b>	526
R. Mendes Lima and E. Massaroppi Jr.	
<b>Elasto-Plastic Modeling of the Limit Strains in Metallic Sheets</b>	532
M.C. Cardoso, L.P. Moreira and M.C.S. Freitas	
<b>Work Hardening and Microstructural Effect during Dynamic Deformation of Polycrystalline Copper</b>	538
S.N. Monteiro, V. Scarpini Cândido, F.S. da Luz and J. Lopes dos Santos	
<b>Special Effects in Deformation Mechanism Maps for Austenitic Stainless Steels</b>	543
S.N. Monteiro, F. Muylaert Margem, L. Tedesco Bolzan, G.L.N. Fernandes and V. Scarpini Cândido	
<b>Kinetic Study on Martensite Formation in Steels 1045 and 4340 under Variable Cooling Rates</b>	550
D.V. Bubnoff, M.M.O. Carvalho, J.A. de Castro and T.R.M. Lourenço	
<b>Characterization of Residual Stresses and Microstructural by Technique of Magnetic Barkhausen Noise of API 5L X80 Steel Heat Treatment</b>	556
S.R. Correa, M.F. de Campos, C.J. Marcelo, J.A. de Castro, M.d.P.C. Fonseca, T.C. Chuvas, M.A. Campos and L.R. Padovese	
<b>Secondary Austenite Precipitation during the Welding of Duplex Stainless Steels</b>	562
S. de Alencar Pires, M.F. de Campos, C.J. Marcelo and C.R. Xavier	
<b>Evaluation of Residual Stresses in Welded ASTM A36 Structural Steel by Metal Active Gas (MAG) Welding Process</b>	567
S.R. Correa, M.F. de Campos, C.J. Marcelo, J.A. de Castro, M.d.P.C. Fonseca, T.C. Chuvas, M.A. Campos and L.R. Padovese	
<b>Artificial Neural Network Model for Predict of Silicon Content in Hot Metal Blast Furnace</b>	572
S.F. David, F.F. David and M.L.P. Machado	
<b>Preparation and Melting of Zr-1.0Nb Alloy</b>	578
A.C. Souza, J.L. Rossi, P. Tsakiroopoulos, L.G. Martinez, C.R. Grandini, F.C. Ceoni, C.S. Muesi and H.P.S. Correa	
<b>Hysteresis Modeling of NdFeB Magnets with High Nd</b>	585
M.F. de Campos, F.A. Sampaio da Silva and J.A. de Castro	
<b>Shape Anisotropy as Coercivity Mechanism</b>	591
M.F. de Campos	
<b>Loss Separation Model: A Tool for Improvement of Soft Magnetic Materials</b>	596
M.F. de Campos	
<b>Perspectives for the Brazilian Industry of Rare-Earth Magnets</b>	602
M.F. de Campos, D. Rodrigues and J.A. de Castro	
<b>EBSD Analysis of SmCoFeCuZr Alloys</b>	608
S.A. Romero, C.G. Hauegen, F.J.G. Landgraf and M.F. de Campos	
<b>Suitable Nanostructures for Obtaining the Maximum Energy Product in Magnets</b>	614
M.F. de Campos and S.A. Romero	
<b>Effect of Cooling Rate on the Corrosion Behavior of As-Cast SAF 2205 Duplex Stainless Steel after Solution Annealing Treatment</b>	620
M.E.R. Cronemberger, S. Nakamatsu, N.A. Mariano, C.A. della Rovere and S.E. Kuri	
<b>Study and Development of Advanced High Strength Steel to Automotive Industry Applications</b>	625
S. de Abreu Martins, C. de Abreu Martins, N. Fonstein and L. Barbosa Godefroid	
<b>The Influence of High Gravity in PbSn Eutectic Alloy</b>	631
F.E. Freitas, R.C. Toledo, A.K.S. Poli, C.Y. An and I.N. Bandeira	
<b>The Influence of Gravity on Eutectic PbSn Alloy Grown by the Vertical Bridgman Method</b>	637
R.C. Toledo, C.Y. An, I.N. Bandeira and F.E. de Freitas	
<b>Displacement of the Ignition Furnace in the Iron Ore Sintering with Re-Circulation of Waste Gases</b>	643
V.S. Guilherme and J.A. de Castro	

## Chapter 6: Coatings and Surface Engineering

<b>Evaluation of Green Corrosion Inhibitors for Applying in Food Packaging</b> V.R. Roque, A.P.J. Roquete, L. Martins Fonseca, A. Mossmann, C.D.C. Luiz, M. Graciela, F.A. Pavan and A.F. Galio	657
<b>Study of the Efficiency of Ag-SiO<sub>2</sub> Nanoparticles as Additives in Anticorrosion Coatings</b> R.d.O. Pletsch, K.G.B. Alves, M.R.S. Vieira, C.P. de Melo and N.S. Bouchonneau	663
<b>Corrosion Behavior of Fe-Mn-Si-Cr-Ni-Co Shape Memory Stainless Steel in Highly Oxidizing Medium</b> C.A. della Rovere, R. Silva, P. Hammer, J. Otubo and S.E. Kuri	669
<b>Characterization of AISI 316L Stainless Steel Pattern via DC Plasma Nitriding</b> K.C. Kleinjohann, B. Borges Ramos, E.A. Bernardelli and A.M. Maliska	675
<b>Development of Coating to Metallic Surfaces with Capacitive Capabilities for Applications in Electronics</b> A.P.J. Roquete, V.R. Roque, L.M. Fonseca, L.A.N. Viana, A.K. Henkes and A.F. Galio	680
<b>Parameters Evaluation of Bond-Coat Deposited by CO<sub>2</sub> Laser Beam for Aeronautical Turbine Blades</b> V. Teleginski, J.C.G. Santos, D.C. Chagas, J.F. Azevedo, A.C. Costa Oliveira and G. de Vasconcelos	685
<b>Structural Changes in TiO<sub>2</sub> Films Formed by Anodizing of Electro-Polished Titanium</b> P. López Díaz, M.C. Pereira, E.N. Codaro and H.A. Acciari	689
<b>Zirconium Based Metal Pretreatments: A Characterization Method for Ecologically Sustainable Thin Film Surface Pretreatments</b> D.J. dos Santos, L.B. Tavares and M.C. Salvadori	693
<b>Corrosion by Sulfate Reducing Bacteria in Welded Joints of Stell API 5L X80</b> E.S.L. Vasconcelos, E.S.D. de Oliveira, M.A.G.A. Lima, M. Montoya, C.H. Gonzalez and S.L. Urtiga Filho	699
<b>Effect of Thermal Aging at Low Temperature on the Mechanical Properties and Corrosion Resistance of LDX 2404 Duplex Stainless Steel</b> R. Silva, C.A. della Rovere and S.E. Kuri	705
<b>Obtaining and Characterization of Zirconium and Cerium Coatings</b> L.O. Berbel, L.A.C. Matos, P.V. Sochadolak, C. Schlindwein, P.R.P. Rodrigues and E.d.P. Banczek	711
<b>Pre-Treatment of Niobium Phosphate for Protection against Carbon Steel Corrosion</b> O.d.R. Antunes Jr., L.A.C. Matos, L.O. Berbel, C. Schlindwein, P.V. Sochadolak, P.R.P. Rodrigues and E.d.P. Banczek	716
<b>Effect of Argon during Diamond Deposition by Hot Filament Chemical Vapor Deposition</b> D.C. Barbosa, U.A. Mengui, M.R. Baldan, V.J. Trava-Airoldi and E.J. Corat	721
<b>Analysis of the Metallurgical Bonding between Inconel and NiCrAlY Coatings by HVOF and with CO<sub>2</sub> Laser Beam</b> A.C. Costa Oliveira, G. Donato, R. Magnabosco, V. Teleginski, D.C. Chagas, G. de Vasconcelos and F. Camargo	727

## Chapter 7: Materials and Technologies for Application in Environmental Engineering

<b>Sorption of Bright Yellow Dyes by Filter Papers</b> E.M. de Araujo Braz, M.S.L. Rosa, M.R.d.M.C. Santos, L.d.S. Santos Jr., J.A. Osajima and E.C. da Silva Filho	735
<b>Functionalization of Cellulose with Cysteamine: Synthesis, Characterization, and Adsorption</b> R.D.S. Bezerra, M.S. Silva, F.J.L. Ferreira, L.S. Silva, J.A. Osajima and E.C. da Silva Filho	740

<b>Cellulose Phosphate Applied in the Removal of the Drug Acetaminophen from Aqueous Media</b>		
R.D.S. Bezerra, A.Í.S. Morais, J.A. Osajima, L.C.C. Nunes and E.C. da Silva Filho		745
<b>Synthesis and Characterization of CMC for Potential Application as Adsorbent in Water Treatment</b>		
F.G.L. Medeiros Borsagli, A.A.P. Mansur and H.S. Mansur		750
<b>Environmental Evaluation of Stabilized and Solidified Products in Brazil: A Review</b>		
E.F. Maciel, F.A. Brehm, M.P. Kulakowski and C.d.S. Kazmierczak		756
<b>Attapulgite Performance in the Degradation of the Yellow Bright Dye</b>		
L.R. Almeida, J.S.N. de Souza, E.C. da Silva Filho and J.A. Osajima		761
<b>Photocatalysis of Coomassie Brilliant Blue Using Clay Mineral</b>		
L.R. Almeida, J.S.N. de Souza, E.C. da Silva Filho and J.A. Osajima		765
<b>Incorporation of Zirconium Oxide on the Surface of Palygorskite Clay for Photodegradation of Industrial Dye</b>		
M.O. Miranda, F.P. de Araújo, J.A. Osajima and E.C. da Silva Filho		768
<b>Application of Palygorskite in Purification Process of Frying Oil</b>		
R.F.d.M. Araújo, L.M.d.S. Freire and L.C.C. Nunes		773
<b>Study of the Interaction of Copper Nanoparticles with Titanium in Landfill Soils Layers</b>		
E.M. de Oliveira, J.A. de Castro and I.L. Ferreira		778
<b>Effluent Treatment of Synthetic Tanning by Nanomaterials Photocatalytic</b>		
C.A.P. de Lima, G.G.C. de Lima and F.F. Vieira		784
<b>Synthesis and Photocatalytic Evaluation of Nanocrystalline ZnO Obtained by High Energy Milling</b>		
J.A. Dias, V.L. Arantes, A.S. Ramos, T.R. Giraldi, M.Z. Minucci, M.F. Toledo and S.C. Maestrelli		789
<b>Ion Exchange in Sodium Titanate Nanoribbons and its Application in Dye Photodegradation of Remazol Blue</b>		
L.N. Costa, F.X. Nobre, B.C.V. Neto and J.M.E. de Matos		795

## Chapter 8: Films and Membranes

<b>Influence of the Addition of Inorganic Salt in Obtaining Hybrid Membranes</b>		
K.M. Medeiros, D.F. Lima, C.A.P. de Lima, E.M. Araújo, H.L. Lira and R.A. da Paz		803
<b>Electrochemical Behavior of Electroactive PVS/PANI Films Containing Chemically Modified Cellulose</b>		
P.R.S. Teixeira, A.S.d.N.M. Teixeira, J.R. Teixeira da Silva, E.A.d.O. Farias, N.d.A. Dionisio, E.C. da Silva Filho and C. Eiras		809
<b>Development of Polymer Membranes Modified with a Porogenic Agent</b>		
K.M. Medeiros, D.F. Lima, C.A.P. de Lima, E.M. Araújo, H.L. Lira and V.d.N. Medeiros		815
<b>Photosensitized Polystyrene Film for Dye TX under Different Radiation Sources</b>		
J.A. Osajima, C.C. Schmitt Cavalheiro and M.G. Neumann		820
<b>Influence of Content and Treatment of Clay in the Morphology of PES Membranes</b>		
V.d.N. Medeiros, T.C. de Carvalho, A.M.D. Leite, E.M. Araújo, R.A. da Paz and H.L. Lira		824
<b>Mechanical Analysis of Biodegradable Films from Native and Chemically Modified Potato Starches</b>		
L.M. Fonseca, V.R. Roque, A.P.J. Roquete, A. Mossmann, L.A.N. Viana, A.K. Henkes, C.D.C. Luiz, A.F. Galio and E.d.R. Zavareze		830
<b>Morphological Analysis of Membranes of PES/Commercial Clay</b>		
T.C. de Carvalho, V.d.N. Medeiros, E.M. Araújo and A.M.D. Leite		835
<b>Nanostructured and Electroactive Hybrid Films Containing Microcrystalline Cellulose Modified with the Phosphate Group: Synthesis and Characterization</b>		
P.R.S. Teixeira, A.S.d.N. Marreiro, J.R. Teixeira da Silva, E.A.d.O. Farias, N.d.A. Dionisio, E.C. da Silva Filho and C. Eiras		840

## Chapter 9: Materials and Technologies in Biomedical Engineering

<b>Development and Evaluation of Capsule of Sodium Diclofenac and Paracetamol Using Mesocarp Babassu Powder as Excipient - Part II</b>	I.d.C. Barros, L.M.d.S. Freire, J.L. Soares Sobrinho, E.C. da Silva Filho and L.C.C. Nunes	849
<b>Morphological Evaluation of Chitosan/Curcumin Beads and Powder: Effect of the Methanol as a Solvent</b>	M. Costa da Silva, M.D.R. Leite, S.S. Lima Oliveira, T.B. Fideles and M.V.L. Fook	854
<b>Evaluation of Antibacterial Activity of Chitosan Membranes Associated to Unripe Banana Peel</b>	P. Battaglini Franco, L.A. de Almeida, R.F.C. Marques, G. Brucha and M.G.N. Campos	859
<b>Development and Characterization of Chitosan Membranes as a System for Controlled Release of Piperine</b>	I.V.S.R. Nascimento, M.K.d.S. Souza, W.T. Barbosa, T.B. Fideles, T.M.A. Marinho and M.V.L. Fook	864
<b>Antibacterial Activity of a Chitosan Derivative Obtained in the Absence of a Solvent</b>	L.R. Osório, I.S. Lima, H.M. Barreto, J.A. Osajima and E.C. da Silva Filho	869
<b>Evaluation of the Potential of Mesocarp Babassu Powder as a Technological Excipient to Pharmaceutical Industry - Part I</b>	I.d.C. Barros, L.M.d.S. Freire, J.L. Soares Sobrinho, E.C. da Silva Filho and L.C.C. Nunes	874
<b>Synthesis and Characterization of <math>\text{Fe}_3\text{O}_4</math> Nanoparticles Stabilized by Polyvinylpyrrolidone/Polyethylene Glycol with Variable Mass Ratios</b>	F.A. Sampaio da Silva, M.F. de Campos and E.E.G. Rojas	880
<b>Synthesis and Characterization of Ceramic Modified with Niobium for Biomedical Applications</b>	N.S.V. Capanema, A.A.P. Mansur and H.S. Mansur	884
<b>Hydroxyapatites Obtained from Different Routes and their Antimicrobial Properties</b>	G.T. Feitosa, M.V.B. Santos, H.M. Barreto, L.C.C. Nunes, J.A. Osajima and E.C. da Silva Filho	890
<b>Hydroxyapatite Nanoparticles: Synthesis by Sonochemical Method and Assessment of Processing Parameters via Experimental Design</b>	L. Fernandes Cota, K.P.M. Licona, J.d.N. Lunz, A.A. Ribeiro, L.M. Alonso, M.V. de Oliveira and L.C. Pereira	896
<b><math>\beta</math>-TCP Produced through the Starch Consolidation Technique</b>	T.N. Gondim, S.C. Maestrelli, M.G.N. Campos, M.Z. Minucci, R.F.C. Marques and R.S. Fernandes	902
<b>Effect of Some Heat Treatments on Anelastic Properties of Ti-15Zr-xMo Alloys</b>	D.R.N. Correa, M.L. Lourenço, P.A.B. Kuroda, M.A.R. Buzalaf and C.R. Grandini	907
<b>Surface Modification of the Alloy Ti-7.5Mo by Anodization for Biomedical Applications</b>	A.L. do Amaral Escada, J.A. Muñoz Chaves and A.P. Rosifini Alves Claro	913
<b>Osseointegration of Ti-30Ta Implants without Primary Stability: Effect of Tranexamic Acid</b>	M.C. Rosifini Alves Rezende, B.C. Capalbo, M.J.Q. Louzada, A.L.R. Rangel, L.Á. Cintra, J.A.G. de Oliveira, P.N. Lisboa-Filho, C.M. Wada and A.P. Rosifini Alves Claro	918
<b>Nanotubes Growth on Ti-15Mo Alloys by Anodization at Low Voltage</b>	A.L.R. Rangel, G.R. Moreira Santos and A.P. Rosifini Alves Claro	924
<b>Surface Modification of Ti-30Ta Alloy by Electrospun PCL Deposition</b>	C.M. Wada, A.L.R. Rangel, M.A. de Souza, R.d.S. Almeida, M.A. D'Ávila, A.P. Rosifini Alves Claro and M.C. Rosifini Alves Rezende	930
<b>Mechanical and Microstructural Characterization of the Ti-25Ta-25Nb Alloy for Dental Applications</b>	M.R. Seixas, C. Bortolini Jr., R.T. Konatu, A. Pereira Jr. and A.P. Rosifini Alves Claro	935
<b>Preparation and Characterization of Ti-10Mo-xZr Alloys for Biomedical Applications</b>	R.O. de Araújo, M.A.R. Buzalaf and C.R. Grandini	940
<b>Preparation, Microstructural Characterization, and Selected Mechanical Properties of Ti-20Zr-2.5Mo and Ti-20Zr-7.5Mo Used as Biomaterial</b>	P.A.B. Kuroda, M.A.R. Buzalaf and C.R. Grandini	946
<b>Effect of Hot Swaging on Microstructure and Properties of Aged Ti-10Mo-20Nb Alloy</b>	S.G. Borborema, J. Dille, C.A. Nunes, E. Santos Jr., R. Baldan, P. Mei, M. Castro Rezende, L.S. Araujo and L.H. de Almeida	952
<b>Evaluation of Setting Time, Ions Release, Sealing Ability and Adhesion of a Novel Experimental Endodontic Cement</b>	A.D. dos Santos, M.M.D.S. Sostena, J.C. Barbosa, P.H. dos Santos, M.G. Gandolfi, C. Prati and J.C. Silos Moraes	957

**Biocidal Glasses with High Performance: Comparison of the Antimicrobial Action Obtained by Use of Different Metal Ions**

H. Riss, K. Testa, K. Betiatto, E. Mendes, R. Piletti, M.A. Fiori and H.G. Riella 963

**Different Synthesis Routes for Hydroxyapatite Nanoparticles by Mechanical Stirring**

J.d.N. Lunz, K.P.M. Licona, A.A. Ribeiro, J.A. Delgado, L.M. Alonso and M.V. de Oliveira 969

**Chapter 10: Semiconductors and Materials for Alternative Energy****Deposition by Spray-Pyrolysis of Tin Oxide Doped with Fluorine Produced by Sol-Gel Method**

P.H.F. Maia Jr., F. Marcone Lima, A. Cosmo de Sena, Á.N. Silva, F. Mota Martins, A.F. Leite de Almeida and F.N.A. Freire 977

**Synthesis of ZnO Nanoparticles Doped with Cobalt: Influence of Doping on the Magnetic and Fluorescent Properties**

H.J. Sugahara, E.F. de Melo, C.P. de Melo and K.G.B. Alves 982

**Pd-Based Electrocatalysts Prepared by Borohydride Reduction Method for Methanol and Ethanol Electro-Oxidation in Alkaline Medium**

M. Brandalise, M.M. Tusi, E.V. Spinacé and A. Oliveira Neto 987

**Effects of Solvent and Concentration of Borohydride for the Preparation of PtRu/C Electrocatalysts for Direct Methanol Fuel Cell Anodes - A Factorial Design Study**

N.S.d.O. Polanco, M.M. Tusi, M. Brandalise, A. Oliveira Neto and E.V. Spinacé 992

**Chapter 11: Materials and Technologies in Chemical Engineering****Influence of Time and Temperature on Directional Growth of MoO<sub>3</sub>**

C. Ferreira da Silva, A. Lima e Silva, F.X. Nobre, E.C. da Silva Filho, L.d.S. Santos Jr., M.R.d.M.C. Santos and J.M.E. de Matos 1001

**Kinetic of Self-Reducing Mixtures of Iron Ore and Biomass of Elephant Grass**

E.P. Rocha, J.A. de Castro, F.d.P. Vitoretti and F.V. Junior 1007

**Sintering of Manganese Ore Tailings under an Argon Atmosphere**

M.M.F. Lima, F. Valduga and R.M.F. Lima 1013

**Influence of Clay Swelling Inhibitor in Filtration Properties of Water-Based Drilling Fluids**

R.S. Leite, A.P.T. Dantas and L.V. Amorim 1018

**Contaminants Recovery from Acid Mine Drainage**

P. Lima, H.T. Fukuma, S. Nakamatsu, M.G.N. Campos, M.G.N. Campos, E.C.T. Ramos and N.A. Mariano 1023