2010 MRS

FALL MEETING

Boston, MA • November 29–December 3

PROGRAM AND EXHIBIT GUIDE

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P10.4 TRANSFERRED TO P3.76

P10.5
Nanomechanics, Bending Stability, and Failure of Layered Silicates as Function of CEC and Stress. Yao-Tsung Fu[1], Gregory D. Zartman[1], Hua Liu[1], Ras B. Pandey[2], Lawrence F. Drummy[3] and Hendrik Heinz[1]; [1]Department of Polymer Engineering, University of Akron, Akron, Ohio; [2]Department of Physics, University of Southern Mississippi, Hattiesburg, Mississippi; [3]Nanostructured and Biological Materials Branch, Air Force Research Laboratory, Wright-Patterson AFB, Ohio.

P10.6
Surface Modification Effect in Polycrystalline Y_2O_3 Subjected to High Pressure Processing Stuart Deutsch, Jafar F. Al-Sharab, Bernard H. Kear, Oleg Voronov and Stephen D. Tse; Materials Science & Engineering, Rutgers University, Piscataway, New Jersey.

P10.7
Electronic Transport Properties of Graphene with Extreme Mechanical Deformation. Haiyuan Gao[1], Yang Xu[1], Bin Yu[2] and Zhonghe Jin[1]; [1]Institute of Microelectronics and Optoelectronics, Zhejiang University, Hangzhou, China; [2]College of Nanoscale Science and Engineering, State University of New York, Albany, New York.

P10.8
Abstract Withdrawn

P10.9
Grain Boundary Related Indentation Strain Bursts in Mo and Ta Metals. Girija R. Marathe and Rainer J. Hebert; Department of Chemical,Materials and Biomolecular Engineering, University of Connecticut, Storrs, Connecticut.

P10.10
Abstract Withdrawn

P10.11
Micro-devices Based on Reversible Deformation of Thin-films by Surface-chemical Modification. Jatinder S. Randhawa, Michael D. Keung, Pawan Tyagi and David H. Gracias; Department of Chemical and Biomolecular Engineering, Johns Hopkins University, Baltimore, Maryland.

P10.12 TRANSFERRED TO P8.5

P10.13
Abstract Withdrawn

P10.14
Shell Adhesion in the Presence of Long-range Attraction I: Spherical Cap. Jiayi Shi, Sinan Muftu and Kai-tak Wan; Mechanical and Industrial Engineering, Northeastern University, Boston, Massachusetts.

P10.15
Geometrically-controlled Mechanomutability. Lin Han[1], Lifeng Wang[2], Khek-Khiang Chia[3], Robert E. Cohen[3,4], Michael F. Rubner[1,4], Mary C. Boyce[2] and Christine Ortiz[1]; [1]Department of Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts; [2]Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts; [3]Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts; [4]Center for Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts.

P10.16
Atomic Scale Plasticity in Magnesium and Mg-Al Alloys. Thomas Nogaret[1], Louis G. Hector[2] and William A. Curtin[1]; [1]Mechanical Engineering, Brown University, Providence, Rhode Island; [2]GM Technical Center, General Motors, Warren, Michigan.

P10.17
Reaction Pathway Analysis of Homogeneous Dislocation Nucleation in a Perfect Molybdenum Crystal. Hasan A. Saeed, Satoshi Izumi, Shotaro Hara and Shinsuke Sakai; Department of Mechanical Engineering, The University of Tokyo, Tokyo, Japan.

P10.18
Nanoparticle Induced Ductility in Zirconium Oxide. Deeder Aurongzeb, Reliability Engineering, The University of Maryland, College park, Maryland.

P10.19
Mechanical Properties of Thermoplastic Starch (TPS), Polycaprolactone (PCL) and Sisal Fibers Biocomposites Reinforced with Surface Modified Sisal Fibers. Adriana d. Campos[1], Eliangela Teixeira[1], Rodrigo Tonelli[1], Ana Carolina Correa[1], Jose Manoel Marconcini[1], Sandra Mara Martins-Franchetti[2] and Luiz Henrique Capparelli Mattoso[1]; [1]Laboratório Nacional de Nanotecnologia para o Agronegócio, Embrapa Instrumentação Agropecuária, São Carlos, So Paulo, Brazil; [2]Biochemistry and Microbiology Department, Universidade Estadual Paulista Júlio de Mesquita Filho - UNESP, Rio Claro, So Paulo, Brazil.

P10.20
Atomistic Study of the Mechanical Properties of Cu-Zr Metallic-glass Nanowires. K. Koshiyama and K. Shintani; Department of Mechanical Engineering and Intelligent Systems, University of Electro-Communications, Chofu, Tokyo, Japan.

P10.21
Atomistic Study of the Mechanical Stability of Multi-layered Graphene Nanobridges. T. Nakajima and K. Shintani; Department of Mechanical Engineering and Intelligent Systems, University of Electro-Communications, Chofu, Tokyo, Japan.

P10.22
In-Situ Spectroscopy and Modeling Approaches for Deformation Behavior of Nanoscale Interface Materials. Takakazu Suzuki[2], W. Suetaka[1], A. H. Suzuki[1], T. Sato[1] and T. Suzuki[1]; [1]TSS Research Laboratory, Tsukuba, Japan; [2]Nano-System Research Institute, AIST, Tsukuba, Japan.

P10.23
Dislocation Junctions and Jogs in a Free-standing FCC Thin Film. Seok-Woo Lee[1], Sylvie Aubry[2], Wei Cai[2] and William D. Nix[1]; [1]Materials Science and Engineering, Stanford University, Stanford, California; [2]Mechanical Engineering, Stanford University, Stanford, California.

P10.24
Micro/Nano Structure and Morphology of Multi-phase Polymer/Oxide Composites Prepared by Powder Melt Processing. Giorgiana Giancola and Richard L. Lehman; Materials Science and Engineering, Rutgers University, Piscataway, New Jersey.

P10.25
A New Method to Evaluate the Interfacial Friction between Carbon-nanotubes and Matrix. Quan Xu[1], Yuqin Yao[2], Jianyu Liang[2] and Zhenhai Xia[1]; [1]Department of Mechanical Engineering, The University of Akron, Akron, Ohio; [2]Department of Mechanical Engineering, Worcester Polytechnic Institute, Worcester, Massachusetts.

P10.26
Mechanical Properties and Size Effect of <111>-oriented Si Nanowires. Yong-Jae Kim, In-Chul Choi, Kwangsoo Son, Won Il Park and Jae-il Jang; Materials sicence and engineering, Hanyang univeresity, Seoul, Korea, Republic of.

P10.27
Fracture Mechanism of Copper Micro-crystals by Diamond Single Crystal. Seisuke Kano and Atsushi Korenaga; AMRI, AIST, Tsukuba, Ibaraki, Japan.

P10.28
Influence of Processing Conditions on Mechanical and Structural Properties of Micrometer-order DLC Structures Produced by FIB-CVD Method. Naomichi Sakamoto[1], Yusai Akita[2], Hiroyuki Harada[2], Takuya Yasuno[1] and Yasuo Kogo[2]; [1]Science and Technology, Iwaki Meisei University, Iwaki, Japan; [2]Material Science and Technology, Tokyo University of Science, Noda, Japan.

P10.29
Effect of Ag Content on Electrical Conductivity and Tensile Properties of Cu-Ti-Ag Alloys. Taek-Kyun Jung, Hyuk-Chon Kwon and Hyo-Soo Lee; Korea Institute of Industrial Technology, Incheon, Korea, Republic of.

P10.30
Size Effect on Bending Properties of DLC Nanopillar Produced by FIB-CVD. Yasuo Kogo[1], Hiroyuki Harada[1], Yoji Shibutani[2], Naomichi Sakamoto[3] and Takuya Yasuno[3]; [1]Department of Material Science and Technology, Tokyo University of Science, Noda, Japan; [2]Department of Mechanical Engineering, Osaka

Program Number: P10.19 **Day / Time:** Thursday, Dec. 2, 8:00 PM - 11:00 PM

Mechanical Properties of Thermoplastic Starch (TPS) , Polycaprolactone (PCL) and Sisal Fibers Biocomposites Reinforced with Surface Modified Sisal Fibers.

A.d.Campos [1]; E.Teixeira [1]; R.Tonelli [1]; A.Correa [1]; J.Marconcini [1]; S.Martins-Franchetti [2]; L.Mattoso [1]

1. Laboratório Nacional de Nanotecnologia para o Agronegócio, Embrapa Instrumentação Agropecuária, São Carlos, São Paulo, Brazil; 2. Biochemistry and Microbiology Department, Universidade Estadual Paulista Júlio de Mesquita Filho - UNESP, Rio Claro, São Paulo, Brazil

Natural fibers as sisal have received considerable attention as an environmentally friendly because of their light weight, non toxic, low cost and biodegradable properties.
However, lack of good interfacial adhesion, low melting point, and poor resistance towards moisture make the use of natural fiber reinforced composites less attractive. Pretreatments of the natural fiber can clean the fiber surface, chemically modify the surface, stop the moisture absorption process, and increase the surface roughness. Among the various pretreatment techniques, chemical treatments is one of the methods for surface modifies the fiber. In the present work, fibers were treated with alkaline peroxide (bleaching). These fibers with surface modification were used in polymer matrix of thermoplastic starch (TPS) and polycaprolactone (PCL), both biodegradable polymers. Sisal fibers, in different compositions: 5, 10 and 20% were extruded in a twin-screw extruder with TPS/PCL (80:20 wt) and analysed by scanning electron microscopy (SEM), mechanical test, dynamic mechanical thermal analysis (DMTA), thermogravimetry (TGA) and differential scanning calorimetry (DSC). Composites with 20% sisal fiber showed increase of 41% of elastic modulus. It is observed by Tan delta curves the increase of Tg when increase the fiber percentage, indicating good adhesion and good dispersion of fiber in matrix. Thermal stability was increased by addition of sisal fibers in matrix. This study showed that sisal fibers treated with alkaline peroxide (bleaching) have good interaction/adhesion with TPS/PCL matrix.

Citation: A.d.Campos, E.Teixeira, R.Tonelli, A.Correa, J.Marconcini, S.Martins-Franchetti, L.Mattoso. Mechanical Properties of Thermoplastic Starch (TPS) , Polycaprolactone (PCL) and Sisal Fibers Biocomposites Reinforced with Surface Modified Sisal Fibers.. Program No. P10.19. *2010 Abstract Viewer.* Boston, MA: Materials Research Society