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Diagnostic Developments for Velocity and Temperature Measurements in Uni-Element Rocket Environments Aug 1995 130 pages

Authors: Kenneth D. Philippart; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH

Full Text

... were obtained for firings with a gaseous oxygen (GO2)/gaseous hydrogen (GH2) coaxial shear injector at axial locations of 1.6 mm (0.063 in.), 6.4 mm (0.25 in.), 12.7 mm (0.5 in.), 25.4 mm (1 in.) and 50.8 mm (2 in.). **Aluminum oxide** particles of various sizes seeded the flow in an attempt to explain the discrepancies. While cold-flow simulations were promising, hot-fire results for the various particles were virtually identical and still lower than earlier data. The hot- firings were ...

Investigations of the Ballistic Response of Brittle Materials. Nov 1995 114 pages

Authors: Charles E. Anderson Jr.; James D. Walker; Jim Lankford; SOUTHWEST RESEARCH INST SAN ANTONIO TX

Full Text

... include experimental testing, numerical simulations, constitutive evaluation, and investigation of fundamental material response to high rate loading. Depth-of-penetration tests with and without cover plates investigated the performance of 99.5% pure **aluminum oxide** tiles to ballistic impact using L/D 10 tungsten heavy alloy projectiles at two impact velocities, nominally 1.5 and 1.8 km/s. Numerical simulations, using the EPIC95 finite element hydrocode, were ...

Investigations of the Ballistic Response of Brittle Materials Nov 1995 114 pages

Authors: Charles E. Anderson Jr.; James D. Walker; Jim Lankford; SOUTHWEST RESEARCH INST SAN ANTONIO TX

Full Text

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Heterogeneous Chemistry in Solid Rocket Motor Plumes Mar 1997 18 pages

Authors: Peter M. Felker; CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY AND BIOCHEMISTRY

Full Text

Reaction rates of ozone decomposition and adsorption/desorption rates of HCl on **aluminum oxide** (alumina) particles were measured by a new technique involving real-time ultraviolet absorption spectroscopy in a static reactor. Reaction probabilities eta are reported for ozone on alpha-alumina, gamma- alumina, and chromatographic alumina (hydoxylated alumina), respectively, over the temperature range -60 to 200 deg C. These measurements expand on previous measurements from this group using a flow tube reactor ...

Physical Characteristics of Fire-Extinguishing Powders Aug 1997 67 pages

Authors: Anthony E. Finnerty; Lawrence J. Vande Kieft; Andrew Drysdale; ARMY RESEARCH LAB ABERDEEN PROVING GROUND MD

Full Text

... ' was defined and applied in order to rank the powders on a size basis. Eleven fire-extinguishing powders and two common commercial powders were examined by both forms of microscopy. The fire-extinguishing grade of **aluminum oxide** had the smallest average characteristic dimension followed by the 'micronized' sodium bicarbonate samples. These sodium bicarbonate powders appeared to have very little agglomeration of the particles. The large amount of drying agent (...

The Design of Metallic Composites Made From Nickel Aluminide Nov 1997 3 pages

Authors: S. L. Phoenix; CORNELL UNIV ITHACA NY DEPT OF MATERIALS SCIENCE AND ENGINEERING

Full Text

The overall objective of this project was to design the microstructure and to test the fracture toughness and creep-rupture properties of metal-matrix composites constructed from NiAl and **aluminum oxide**. The goal has been to obtain a composite that not only has excellent high temperature creep properties, but also has good fracture toughness at room temperature. Principal microstructural variables have been (i) the crystallographic texture in the metallic ...

Processing of Nanocrystalline Nitrides and Oxide Composites Sep 1998 4 pages

Authors: Jackie Y. Ying; Martin L. Panchula; MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMICAL ENGINEERING

Full Text

We have examined various synthesis parameters for producing nanocrystalline **aluminum** nitride and established maps relating surface area and crystallite size to synthesis conditions. Preliminary analysis of the powder compacts and initial sintering studies show a great deal of potential. Green compacts with a very fine average pore size of 5.5 nm were obtained readily. Densities of 96% were achieved without sintering additives after 30 minutes of pressureless sintering at 1900 deg C in flowing nitrogen. We are currently examining sintering behavior at lower temperatures in detail. Future ...

Thin Dense Chrome Bearing Insertion Program; Pyrowear 675 and Cronidur Wear Testing Oct 1998 59 pages

Authors: Michael Johnson; John Laritz; Mark Rhoads; GE AIRCRAFT ENGINES CINCINNATI OH ADVANCED ENGINEERING TECHNOLOGIES DEPT

Full Text

... selected subscale and full-scale tests. Subscale tests evaluated the wear characteristics and corrosion resistance. Full-scale tests demonstrated contamination resistance at normal F110-GE-129 operating conditions with exposure to abnormal **aluminum oxide** contamination levels. Cronidur 30 demonstrated improved corrosion resistance relative to M50 in salt water and tap water in subscale corrosion testing. Pyrowear 675 also demonstrated improved ...

New Approaches to Understanding and Preventing Corrosion of Aluminum and its Alloys Apr 25, 2001 3 pages

Authors: Daniel A. Buttry; WYOMING UNIV LARAMIE DEPT OF CHEMISTRY

Full Text

... in the project is to remove intermetallic inclusions from AA2O24 surfaces by chemical etching. The procedure is to expose the surface to an oxidant, such as persulfate, in the presence of complexing agents, such as ethylene diamine (EN) and EDTA. The objective is to have the complexing agents attack the **oxide**, and facilitate the oxidative removal of noble metals from the intermetallic inclusions. In order to monitor this process, we have developed elemental mapping procedures that allow us to use energy dispersive spectroscopy (EDS) to evaluate the effectiveness of the etching process.

Comparison of Sampler Collection Efficiency Measurements Using a Polydisperse Solid Aerosol and A Monodisperse Liquid Aerosol Jun 2001 17 pages

Authors: Jana Kesavan; Robert W. Doherty; EDGEWOOD CHEMICAL BIOLOGICAL CENTER ABERDEEN PROVING GROUND MD

Full Text

... determine the merits of using a single test of a polydisperse solid aerosol in place of multiple tests of monodisperse liquid aerosols in the characterization of aerosol sampling systems. The polydisperse aerosol chosen was an **aluminum oxide** (Al2O3) commercial abrasive. Analysis of the Al2O3 particles was by a Coulter Particle Size Analyzer. The monodisperse aerosols were fluorescent oleic acid droplets generated by a vibrating orifice aerosol generator (VOAG). Analysis ...

Comparison of Sampler Collection Efficiency Measurements Using a Polydisperse Solid Aerosol and a Monodisperse Liquid Aerosol Jun 2001 17 pages

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Characterization of the SCP 1021 Aerosol Sampler Nov 2001 23 pages

Authors: Jana Kesavan; Robert W. Doherty; EDGEWOOD CHEMICAL BIOLOGICAL CENTER ABERDEEN PROVING GROUND MD

Full Text

This study characterized the SCP 1021 aerosol sampler (SCP Dynamics, Inc., Minneapolis, MN) at flow rates of 1350 L/min and 1000 L/min. Polydisperse **aluminum oxide** (Al2O3) particles were used as the solid particles, and the analysis was by Coulter counter. Fluorescent oleic acid particles were used as the monodisperse liquid particles, and the analysis was by fluorometry. The results show that: (1) the sampling efficiency curves for both solid and liquid particles have a peak at ...

Marked Influence of Crystal Structure on the Friction and Wear Characteristics of Cobalt and Cobalt-Base Alloys in Vacuum to 10-9 Millimeter of Mercury I - Polycrystalline and Single Crystal Cobalt Dec 1964 21 pages

Authors: Donald H. Buckley; Robert L. Johnson; NATIONAL AERONAUTICS AND SPACE ADMINISTRATION CLEVELAND OH LEWIS RESEARCH CENTER

Full Text

Friction and wear characteristics were determined for polycrystalline Cobalt sliding on various materials (polycrystalline cobalt, 440-C, 52l00, and **aluminum oxide**) in vacuum (l0-9 mm Hg). The influence of crystal transformation on the friction and wear characteristics of cobalt were determined by varying sliding velocity and ambient temperature. The effect of orientation of single- crystal cobalt sliding on polycrystalline cobalt was also determined. Friction and wear experiments were ...

Design and Cooling Performance of a Dump-Cooled Rocket Engine Aug 1966 48 pages

Authors: Albert J. Pavli; Jerome K. Curley; Philip A. Masters; R. M. Schwartz; NATIONAL AERONAUTICS AND SPACE ADMINISTRATION CLEVELAND OH LEWIS RESEARCH CENTER

Full Text

... thrust rocket engine operating at 100-psig chamber pressure with gaseous hydrogen and liquid oxygen as propellants and liquid hydrogen as a coolant. Fourteen firings were made; of these, the last four were with a refractory coating of **aluminum oxide** on the flame-side surface. Data showing the measured and analytical heat

fluxes along with coolant temperatures and pressures through the engine for various coolant flows are presented as a means of determining the minimum ...

Novel Corrosion Inhibition Methods for Aluminum Surfaces May 7, 2002 11 pages

Authors: John T. Yates Jr.; PITTSBURGH UNIV PA DEPT OF CHEMISTRY

Full Text

The non-thermal activation of the oxidation of the Al(111) surface has been investigated. It has been found that compared to thermally grown Al2O3 films of equivalent thickness a factor of 10-30 increase in the resistance of **oxide** films may be achieved by the use of non-thermal activation methods such as electron bombardment of adsorbed water, electron bombardment of adsorbed O2 and Al2O3 clusters, and by oxidation by O3.

Overview Environmental Assessment for the Space Based Infrared System (SBIRS) Dec 1996 121 pages

Authors: Anthony C. Davis; Donald L. Koehler; J. D. Latimer; Craig McColloch; David S. Reasons; PARSONS ENGINEERING SCIENCE INC AUSTIN TX

Full Text

... consist of launch vehicle impacts to the stratospheric ozone layer from rocket exhaust and deorbiting debris; and local impacts, which consist of launch clouds from the launch vehicles that will contain hydrochloric acid and **aluminum oxide**, electromagnetic radiation from antennas, and local spills from prelaunch activities. The EA evaluated how the Geosynchronous Earth Orbit Satellites and the launch vehicles would affect air quality, water resources, the water supply, ...

The Potential for Ozone Depletion in Solid Rocket Motor Plumes by Heterogeneous Chemistry Aug 1996 22 pages

Authors: M. S. Hanning-Lee; P. M. Felker; J. A. Syage; John J. Lamb; TRW SPACE AND TECHNOLOGY GROUP REDONDO BEACH CA

Full Text

Rates of ozone decomposition on **aluminum oxide** (alumina) particles were measured in a flow tube reactor equipped with molecular beam sampling mass spectrometry and ultraviolet absorption spectroscopy, and in a static reaction cell equipped with ultraviolet absorption spectroscopy. Reaction probabilities eta are reported for ozone on alpha-alumina, gamma-alumina, and chromatographic alumina (hydroxylated alumina), respectively, over the temperature range -60 to 200 degrees C. This work addresses the potential for stratospheric ozone depletion by launch ...

Stratospheric Effects of Rocket Exhaust: Heterogeneous Processes Sep 30, 1999 14 pages

Authors: Mario J. Molina; John R. Edwards; Daniel Pilson; Tyrrel W. Smith Jr.; TRW INC REDONDO BEACH CA ELECTRONICS AND TECHNOLOGY OPERATIONS

Full Text

The focus of this project has been the laboratory investigation of chemical processes involving the effects of particles emitted by solid rocket motors (SRMs) on stratospheric ozone. Emphasis has been placed on the efficiency of the catalytic chlorine activation process occurring on the surface of **aluminum oxide** particles.

Effect of Fiber-Reinforced Plastic Strength Properties on the Ballistic Performance of Ceramic Composite Armor Nov 1998 24 pages

Authors: James F. Mackiewicz; Gary Proulx; ARMY SOLDIER AND BIOLOGICAL CHEMICAL COMMAND NATICK MA SOLDIER SYSTEMS CENTER

Full Text

... of weak to relatively strong panels in term of flexural strength, shear strength and elastic modulus. The low resin and corresponding low strength laminates yielded the most efficient armor systems when tested in conjunction with **Aluminum Oxide** (Alsub2Osub3) frontal ceramic component versus the 7.62 mm M80 Ball and .30 cal Armor Piercing projectiles. Although the 5.3% resin laminates possess very low flexural and shear strengths, the data indicates they ...

Investigation of Exothermic Grinding Sludge Produced from Watervliet Arsenal Gun Steels, Andersol Water-Based Cutting Fluid and Cincinnati Milacron Aluminum Oxide Resin Bond Grinding Wheels Jul 1992 17 pages

Authors: Samuel Sopok; Mark Fleszar; John Senick; ARMY ARMAMENT RESEARCH DEVELOPMENT AND ENGINEERING CENTER WATERVLIET NY BENET LABS

Full Text

The Advanced Technology Branch of Benet Laboratories, at the request of the Watervliet Arsenal Fire House, was tasked with the investigation of a Watervliet Arsenal exothermic grinding sludge. An on-site review of this grinding process showed that the grinding sludge apparently smoldered up to twenty-four hours after its production. In addition, within an hour, the sludge quickly reached a surface temperature that would cause a burn upon physical contact. At least one fire directly resulted from the inadvertent mixture of this sludge with a combustible material. Thermogravimetric analysis and ...

Evaluation of Materials for Rapid Runway Repair 2004 6 pages

Authors: Michael Riley; CERATECH INC BALTIMORE MD

Full Text

... products are magnesia/alumina based, but are irregular shaped ground particulates. To add stiffness and additional compressive strength to the product, we will investigate the role of chopped ceramic fibers as low weight additives to the formula. Specifically, this task will focus on the use of discontinuous **aluminum oxide** fibers that have been designed to withstand temperatures as high as 1700 degrees C.

Heat Flux and Infrared Spectral Measurements of Burning SRM Propellant (Preprint) Jun 16, 2006 11 pages

Authors: Marty Venner; James Parker; William McKeon; AIR FORCE RESEARCH LAB EDWARDS AFB CA PROPULSION DIRECTORATE

Full Text

... during a nominal portion of the burn and supports a classification of 1.4. A Fourier Transform Infrared (FTIR) spectrometer collected data over a spectral range of 1.4 - 14 micrometers. Those data show strong gaseous emissions from carbon dioxide, water, and hydrogen chloride as well as a continuum emission component due to the **aluminum oxide** particulates.

Freeform Extrusion of High Solids Loading Ceramic Slurries. Part 1: Extrusion Process Modeling Jul 2006 16 pages

Authors: Michael S. Mason; Tieshu Huang; Robert G. Landers; Ming C. Leu; Gregory E. Hilmas; MISSOURI UNIV-ROLLA DEPT OF MATERIALS SCIENCE AND ENGINEERING

Full Text

A novel, solid freeform fabrication method has been developed for the manufacture of ceramic-based components in an environmentally friendly fashion. The method is based on the extrusion of ceramic slurries using water as the binding media. **Aluminum oxide** (Al2O3) is currently being used as the part material and solids loading as high as 60 vol. % has been achieved. This paper describes a novel manufacturing machine that has been developed for the ...

Freeze-Form Extrusion Fabrication of Alumina Components Using Aqueous Paste Jul 2006 22 pages

Authors: Tieshu Huang; Michael S. Mason; Gregory E. Hilmas; Ming C. Leu; MISSOURI UNIV-ROLLA DEPT OF MATERIALS SCIENCE AND ENGINEERING

Full Text

Freeze-form Extrusion Fabrication (FEF) is an environmentally friendly solid freeform fabrication method that uses aqueous pastes to fabricate ceramic-based components. The process uses only small quantities (2 to 4 vol.%) of organic binder. Using the FEF process, 3-D ceramic components have been fabricated from **aluminum oxide** (Al2O3) by extrusion deposition of Al2O3 paste in a layer-by-layer manner utilizing a 3-D gantry controlled by a computer using Labview software. Sintered samples have achieved 98% of their theoretical density, demonstrating the feasibility of the FEF process.

Crested Tunnel Barriers for Fast, Scalable, Nonvolatile Semiconductor Memories (Theme 3) Dec 2006 14 pages

Authors: Konstantin K. Likharev; Tso-Ping Ma; STATE UNIV OF NEW YORK AT STONY BROOK

Full Text

... that may potentially replace DRAM as the main random access memories of semiconductor electronics. With that objective, we have combined the expertise at Stony Brook University in crested barrier theory (Prof. Konstantin Likharev) and **aluminum oxide** layer growth (Prof. James Lukens, Dr. Vijay Patel) with that of Yale University (Prof. T.P. Ma, Dr. X. Wang) in jet vapor deposition of silicon nitride and silicon dioxide films, as well as ...

Heat Flux and Infrared Spectral Measurements of Burning SRM Propellant (Postprint) Jun 16, 2006 11 pages

Authors: Marty Venner; James Parker; William McKeon; ENGINEERING RESEARCH AND CONSULTING INC (ERC INC) EDWARDS AFB CA

Full Text

... was obtained during a nominal portion of the burn and supports a classification of 1.4. A Fourier Transform Infrared (FTIR) spectrometer collected data over a spectral range of 1.4 - 14 m. Those data show strong gaseous emissions from carbon dioxide, water, and hydrogen chloride as well as a continuum emission component due to the **aluminum oxide** particulates.

Global Mechanical Response and Its Relation to Deformation and Failure Modes at Various Length Scales Under Shock Impact in Alumina AD995 Armor Ceramic Mar 2008 18 pages

Authors: D. P. Dandekar; J. W. McCauley; W. H. Green; N. K. Bourne; M. W. Chen; ARMY RESEARCH LAB ABERDEEN PROVING GROUND MD

Full Text

Polycrystalline **aluminum oxide** (Al2O3) based materials have both personnel and ground vehicle armor applications. However, their ballistic performance can vary significantly. At the root of this problem is the identification of the fundamental macro and micro mechanisms of deformation and failure in the ballistic event which has proven very elusive over the years. Using a newly developed soft recovery plate impact experiment, a multi-disciplinary, multi-national collaboration has, for the first time, determined micro and macro deformation and damage mechanism maps ...

Global Mechanical Response and its Relation to Deformation and Failure Modes at Various Length Scales under Shock Impact in Alumina AD995 Armor Ceramic Nov 1, 2006 40 pages

Authors: D. P. Dandekar; J. W. McCauley; W. H. Green; N. K. Bourne; M. W. Chen; ARMY RESEARCH LAB ABERDEEN PROVING GROUND MD

Full Text

Polycrystalline **aluminum oxide** (Al2O3) based materials have both personnel and ground vehicle armor applications. However, as their ballistic performance can vary significantly it is important to identify the fundamental macro and micro mechanisms of deformation and failure in the ballistic event. This has proven elusive over the years. Using a newly developed soft recovery plate impact experiment, a multidisciplinary, multi-national collaboration has, for the first time, determined micro and macro deformation and damage mechanism maps relating the experimentally ...

Silicon Nanostructures, Excitonic Interactions, Laser Consequences Jul 11, 2008 7 pages

Authors: Jimmy Xu; BROWN UNIV PROVIDENCE RI DEPT OF PHYSICS

Full Text

Optically pumped laser emission is achieved at cryogenic temperatures (<85K) on carbon-implanted nano-patterned silicon-on-insulator. By using ion-implantation and solid-phase-epitaxy for recrystallization, a 30x improvement in the luminescence intensity of silicon is reported. Nano-patterning was achieved though reactive-ion-etching using an anodized **aluminum oxide** membrane as mask. The results described here lay a solid foundation for the next phase of development aimed at achieving room-temperature lasing in silicon.

Nanoindentation Technique at Investigating of Aluminum Oxide - CrC Nanoparticles Composite Coating 2003 6 pages

Authors: Maksim V. Kireitseu; NATIONAL ACADEMY OF SCIENCES MINSK (BELARUS) DEPT OF MECHANICS AND TRIBOLOGY

Full Text

In this paper fatigue and fracture of Al-Al2O3-CrC nanostructured composite coatings was investigated by nanoindentation technique and in-situ experiments performed by a scanning electron microscope to permit examination of freshly exposed surfaces. Crystallographic and morphological textures were characterized and fracture resistance was measured. CrC layer improves fracture resistance of alumina layer. CrC layer produced by pyrolitic deposition (CVD) may effectively heal pores and defects of alumina layer. It resulted in high load rating of the composite coating. Experiments reveal that in ...

Rheological Behaviour and Model of Metal - Polymer - Ceramic Composite 2003 6 pages

Authors: Maksim V. Kireitseu; NATIONAL ACADEMY OF SCIENCES MINSK (BELARUS) DEPT OF MECHANICS AND TRIBOLOGY

Full Text

In the present paper rheological behaviour of composite coating consisting of **Aluminum Oxide** - Polymer - Chrome Carbide was examined by using rheological models for principal Hertzian contact of a sphere and a plate. The crystallographic and morphologic texture was characterized and the fracture resistance was measured using fracture-mechanics. A rheological model of the composite coating has been proposed and confirmed by in situ experiments. Several requirements to rheological models were formulated ...

THE STRUCTURAL-KINETIC INVESTIGATION OF THE PROCESS OF OXIDATION OF NICKEL, CHROME, AND ALLOYS BASED UPON THEM Mar 2, 1966 16 pages

Authors: D. V. Ignatov; R. D. Shamgunova; FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH

Full Text

... speed of oxidization of chrome at temperatures of 800 - 1000C. The **oxide** films originating on this alloy consist at 400C of **oxide** ... nickel (Ni0); at 500 - 700C they consist of **oxide** of chrome (alpha - Cr203); at 800 - 1000C - of ... the spinel type (NiCr204). That of the inside layer consists of **oxide** of chrome (alpha - Cr203). The speed of oxidization of the nickel-chrome alloy decreases with additions of **aluminum**. For a satisfactory protection of the alloy Ni-Cr from oxidization up to ... 5% suffices and at 1000C, 7% suffices. **Oxide** films forming on alloys with 1% of **aluminum** with 4. 18% A1, 7.22% A1, ...

The Electrochemical Oxidation of Barrier-Layer Metals Oct 7, 1964 18 pages

Authors: I. S. Zhukova; L. L. Odynets; JOINT INTELLIGENCE OBJECTIVES AGENCY WASHINGTON DC

Full Text

... in electrolytes are the barrier-layer metals. They include **aluminum**, tantalum, niobium, zirconium and certain other ... semi metals possess analogous properties. **Oxide** films on **aluminum** have for a comparatively long time obtained ... for these purposes Many attempts at the practical use of the barrier- layer properties of **oxide** films on **aluminum** and tantalum in electrolytic rectifiers were ... Now there is renewed interest in this question. The application of **oxide** films in dry capacitors also possesses significant ... , cryotrons , relays, and so forth. **Oxide** films on semiconductor materials allow the obtaining ...

Contact Resistance and Stability Analysis of Oxide-Based Thin Film Transistors Sep 19, 2006 111 pages

Authors: Celia M. Hung; OREGON STATE UNIV CORVALLIS DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

Full Text

... assessment. Determination of the contact resistance of indium tin **oxide** (ITO) on two wide-band gap semiconductors, ... (ZnO) and indium gallium **oxide** (IGO), is attempted and the effects of contact resistance on ... are employed: ZnO on SiO2, ZnO on **aluminum** titanium **oxide** (ATO), and IGO on SiO2. ... 3 semiconducting materials: ZnO, zinc indium **oxide** (ZIO), and IGO, using thermal silicon **oxide** as the gate dielectric. Relatively stable devices are obtained after post-deposition annealing at ... ZnO TFT fabricated using a spin-coat synthesized **aluminum** phosphate (AlPO) as the gate dielectric is also investigated ...

Infiltration Kinetics and Interfacial Bond Strength of Metal Matrix Composites Jul 1992 86 pages

Authors: Glen R. Edwards; David L. Olson; COLORADO SCHOOL OF MINES GOLDEN CENTER FOR WELDING AND JOINING RESEARCH

Full Text

... was experimentally established for the infiltration of SiC particulate by liquid **aluminum**. Experimental wettability studies were completed for aluminum--silicon, ... contact with SiC by utilizing a capillary rise apparatus. The **oxide** layers on the ceramic substrate and on the molten metal surface ... then provided relative estimates of bond strengths for several **aluminum** alloys in contact with silicon carbide. Concepts from surface ... a surface reaction monolayer was sufficient to cause wetting. **Aluminum** matrix composite processing using the liquid metal route is complicated by the **oxide** barrier formed ...

Bondability of Ti Adherends Apr 30, 1980 51 pages

Authors: B. M. Ditchek; K. R. Breen; J. D. Venables; MARTIN MARIETTA LABS BALTIMORE MD

Full Text

... divided into three groups according to similarities in their **oxide** morphologies: Group I exhibits little surface roughness; ... extensive porosity and microroughness, similar to features found on **aluminum** prepared by the phosphoric acid anodize process. Wedge ... II. Hence, a direct correlation exists between **oxide** morphology and bond durability for Ti adherends. We found similar evidence for the importance of **oxide** morphology to the properties of bondments in our prior work on ... of moisture. We conclude, therefore, that the combination of **oxide** stability and micro-roughness that can be developed on Ti ...

Effect of Damage Processes on Spallation Life in Thermal Barrier Coatings Nov 9, 2001 141 pages

Authors: Golam Newaz; WAYNE STATE UNIV DETROIT MI

... bond coat layer that provides needed oxidation resistance to the underlying superalloy. The microstructure of the bond coat changed from high **aluminum** concentration beta-(Ni, Pt)3Al phase, which has a very good

Full Text

oxidation resistance, to beta-(Ni, Pt) ... substrate during the thermal test in air. The microstructure change influenced the oxidation behaviors of the bond coat. Less protective **oxide** (Ni-rich) formed on gamma-(Ni, Pt)3Al due to depletion of **aluminum**, and the **oxide** scale on gamma'-(Ni. Pt)3Al ha less adhesion to the bond coat. The TGO Layer and bond coat was subjected to high residual ...

Distributed Combustion in Solid Propellants Mar 1993 58 pages

Authors: M. W. Beckstead; K. P. Brooks; BRIGHAM YOUNG UNIV PROVO UT DEPT OF CHEMICAL ENGINEERING

Full Text

... an improvement over previous models. Law's model of **aluminum** combustion has been modified to include the effects of multiple oxidizers and their products, **oxide** accumulation on the surface of the burning **aluminum** particle, and convection. There are no adjustable parameters in the improved **aluminum** combustion model, and both transport and thermodynamic ... data than a simple liquid droplet model. The **aluminum** combustion model has also been coupled to ... The results show reasonable agreement with available data for **aluminum** particles burning in the Rijke burner.... Unstable combustion, ...

Weldability of Heat-Resistant Material SAP by Method of Fusion Oct 8, 1964 14 pages

Authors: G. D. Nikiforov; S. N. Zhiznyakov; JOINT PUBLICATIONS RESEARCH SERVICE ARLINGTON VA

Full Text

Technology was developed for manufacture of SAP, possessing the ability to be welded by the method of fusion, and also technology of its argon- arc welding. Of all existing **aluminum** alloys, sufficient strength at a temperature of 350 - 5000 0 can be preserved only by material from sintered **aluminum** powder (SAP), the strengthening phase in which is **oxide** of **aluminum**. basic initial product for obtaining SAP is finely-dispersed **aluminum** powder which is obtained by atomization of liquid **aluminum** with compressed air, with subsequent crushing in ball mills in an oxidizing atmosphere.

OXIDATIVE DETONATIONS INITIATED BY HIGH VELOCITY IMPACTS May 1965 51 pages

Authors: A. P. Caron; NORTHROP SPACE LABS HAWTHORNE CA

Full Text

... 25 and 0.30 mm thick) retaining oxygen at one atmosphere have been observed to burst when impacted with steel and **aluminum** spheres (3.2 mm diameter) at velocities beyond 5.8 and 6.3 Km/sec, respectively. Visible deposits of **aluminum** and iron **oxide**, target sheet bulges, strong light intensities, and pressure gauge traces of detonation waves indicate that the bursting pressures were caused by the violent oxidation of steel and **aluminum**. Evidence of such reactions were detected over a wide range of impact velocities (4.88 to 8.02 Km/ ...

Defects and Impurities in 4H- and 6H-SiC Homoepitaxial Layers: Identification, Origin, Effect on Properties of Ohmic Contacts and Insulating Layers and Reduction Dec 1997 24 pages

Authors: R. F. Davis; M. O. Aboelfotoh; B. J. Baliga; R. J. Nemanich; NORTH CAROLINA STATE UNIV AT RALEIGH

Full Text

... inversion layer mobilites of 60 sq cm/V.s and 72 sq cm/ V.s were determined for the MOSFETs fabricated on 4H- and 6H-SiC, respectively. **Aluminum** nitride thin films were also grown by GSMBE on 4H and 6H-SiC substrates. Streaked RHEED patterns indicated smooth films and, for the ... enhanced chemical vapor deposition were employed with oxygen and nitrous **oxide** to deposit a silicon **oxide** on 6H-SiC(0001). The resulting morphology was compared with an analogous **oxide** produced via thermal oxidation and with the base SiC substrate. The RMS values of the surface roughness of the initial insulator and ...

Effect of Nanoparticles on Complement System in Cell Culture Model Sep 15, 2006 21 pages

Authors: Dariusz T. Sladowski; MEDICAL UNIV OF WARSAW (POLAND)

Full Text

... , Different sizes of nanoparticles such as silver (Ag; 151,000 nm) molybdenum (MoO3; 30 150 nm), **aluminum** (Al; 30 103 nm), iron **oxide** (Fe3O4; 30, 47 nm) and titanium dioxide (TiO2-40nm) were evaluated for their complement activation potential, The complement activation properties of relatively larger particles of cadmium **oxide** (CdO; 1 micrometer) manganese **oxide** (MnO2; 1-2 micrometers), and tungsten (W; 27 micrometers) were assessed, Additionally the effects of nanoparticles coated with lipopolysaccharide on complement activator properties were ...

A STUDY OF THE EFFECT OF SURFACE FILMS ON FATIGUE FRACTURE Sep 18, 1964 39 pages

Authors: J. C. Grosskreutz; C. Q. Bowles; MIDWEST RESEARCH INST KANSAS CITY MO

Full Text

The complete absence of a corrosive atmosphere during the deformation of **aluminum** leads to a postponement of the formation of slip bands in which fatigue cracks are known to initiate. This phenomenon ... loops is associated with surface slip lines, the debris being of higher density in gold than in **aluminum**. The difference is presumably due to a lower activation energy for climb in **aluminum**. The formation of the slip step results in a lattice strain surrounding the step. This strain occurs regardless of the presence of an **oxide** layer. This strain may be the cause of slip-step height saturation.

Dislocation Transport of Oxygen During Fatigue Crack Growth May 1977 53 pages

Authors: John W. Swanson; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH

Full Text

... for Monel 404 and commercially pure titanium. Little increase in growth rate is observed for **aluminum** 7075-T651 and 2219-T87 alloys. Enhanced concentration of oxygen in the metal matrix due ... to a vacuum environment is indicated for Monel 404, commercially pure titanium, **aluminum** 7075-T651 and **aluminum** 2219-T87. This is consistent with a dislocation transport mechanism. Sample roughness appeared to contribute ... rough estimate of dislocation transport depths of 125 to 600 A is made based on expected **oxide** thickness. The fracture surfaces from oxygen and vacuum environments appear the same for each ...

Surface Quality Impact of Replacing Vapor Degreasers with Aqueous Immersion Systems Mar 1997 87 pages

Authors: C. Kodres; D. Polly; T. Hoffard; G. Anguiano; ENVIRONMENTAL PROTECTION AGENCY CINCINNATI OH RISK REDUCTION ENGINEERING LAB

... of aqueous immersion degreasing and vapor degreasing for removing contaminants from an **aluminum** surface are compared. Intentionally soiled, artificially weathered 7075 **aluminum** panels are degreased and then either anodized or chemically conversion coated. The quantity and ... no effect on the performance of anodized or chemically conversion coated **aluminum** surfaces. Performance is assessed in terms of resistance to both corrosion and abrasion and on the integrity of the **oxide** coating. The subsequent light duty immersion cleaning and pickling removes ...

Full Text

Template-Growth of Highly Ordered Carbon Nanotube Arrays on Silicon POSTPRINT Sep 2006 5 pages

Authors: Aijun Yin; Marian Tzolov; David Cardimona; Jimmy Xu; BROWN UNIV PROVIDENCE RI DEPT OF ENGINEERING

... or unprecedented uniformity on silicon. The uniformity is ensured through the growth within the highly ordered nanopores or an alumina **oxide** template, which is in turn formed on silicon through anodization of **aluminum** of unprecedented thickness evaporated on silicon. The formation of highly ordered nanopore array by anodization of thick **aluminum** evaporated on a noncompliant substrate such as silicon is made possible through a specially designed process for evaporating thick **aluminum** of high quality and good adhesion.

Full Text

THE DEVELOPMENT OF HEAT-RESISTANT PAINTS FOR METALS Aug 2, 1962 20 pages

Authors: R. W. Liggett; SOUTHWEST RESEARCH INST SAN ANTONIO TX

Coatings produced from zinc **oxide** and polyphosphoric acid did not resemble those produced from zinc **oxide** (ZnO), dimethyl hydrogen phosphite (DMHP), and ethyl acid phosphate (EAP). Coatings (ZnO-DMHP-EAP) cured above 55% relative humidity at 100 deg F were water resistant but not heat resistant, while those cured below 55% ... . When the ZnO-DMHP-EAP coating material was dissolved in DMHP and the solution was applied to Al, a crusty layer was obtained. When the crust was removed, a surface coating remained that was heat resistant, water resistant, coherent, hard, and firmly bound to the **aluminum**.

Full Text

Vapor Phase Impregnation of Active Carbons Apr 1970 57 pages

Authors: D. M. Andrews; COMMONWEALTH SCIENTIFIC CORP ALEXANDRIAVA

... a means for producing carbons having increased protection against toxic agents. Processes were developed for the vapor impregnation of carbon with cupric **oxide**, chromium trioxide, **aluminum** chloride and platinum. Spectrographic analysis of impregnated samples indicated that impregnants were present on these carbons in the ... , while solution processes deposit material only in pores larger than 12 A in diameter. Copper-chromium (**oxide**) vapor impregnated carbons were subjected to treatments designed to produce an impregnant with CK ...

Full Text

Optical Constants Jun 1985 415 pages

Authors: M. R. Querry; MISSOURI UNIV-KANSAS CITY

... regions. The optical constants of the materials were determined by use of Kramers-Kronig methods. The 23 materials were: (1) Sapphire (Al2O3)E//C, (2) Sapphire (Al2O3)E+C, Oxidized **aluminum** mirror, (4) Iron, (5) Hematite (Fe2O3)E//C, (6) Hematite (Fe2O3)E+C, (7) Magnetite (Fe3O4), (8) Cuprous **oxide** (Cu2O) pellet, (9) Zinc **oxide** (Zno) pellet, (10) Copper Ingot, (11) Brass Ingot (90 Cu/10 Zn), (12) Brass Ingot (85 Cu/15 Zn), (13) Brass Ingot(70 Cu/30 Zn), (14) ...

Full Text

A Study of the Microstructural Basis for the Strength and Toughness Properties of Water-Quenched and Air-Cooled HSLA-100, HSLA-100 with Increased Copper, and a ULCB Steel Sep 1991 97 pages

Authors: Thomas C. Mohr; NAVAL POSTGRADUATE SCHOOL MONTEREY CA

... using the optical microscope, SEM, and TEM. The HSLA-100 with increased copper steel was adequately calcium treated and **aluminum** deoxidized as evidenced by the low sulfur content, few MnS stringers, and lack of large **oxide** arrays. The ULCB steel was not calcium treated or Al-killed; nor was it thermo-mechanically processed as shown by the lack of lipped, broken, or elongated stringers. Both MnS ans **oxide** inclusions were present, and consequently, ladle metallurgy would have to be used before the ULCB steel was ...

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