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Surface Analysis of Anodized Aluminum Panels that have been Painted, Bead Blasted, Cleaned, and Treated with a Chemical Conversion Coating, Tri- Service Committee on Corrosion Proceedings Jun 1994 11 pages

Authors: John J. Jusko; OGDEN AIR LOGISTICS CENTER HILL AFB UT

Full Text

... an aircraft undergoes for repainting. This process consisted of stripping the original paint down to the anodized **aluminum** by bead blasting with polymethyl methacrylate (PMMA), cleaning the surface, corrosion removal, followed by a ... , however, areas with slight amounts of PMMA were also detected. The high resolution scans of the **aluminum** peaks showed that the chemical states of **aluminum** changed with the chemical conversion coating time. That is, the surface **aluminum** changed from an unoxidized **aluminum** to a mixture of an **oxide** and a possible complex oxyfluoride surface at longer coating times.

THE CELLULAR STRUCTURE OF THICK-LAYERED ANODIC OXIDE FILMS Jan 9, 1965 14 pages

Authors: N. D. Tomashov; F. P. Zalivalov; FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH

Full Text

The purpose of the report was in the determination of the quantitative interconnection between the thickness of the barrier layer of **oxide** film and the dimensions of the **oxide** cells. For objects of research there were chosen specimens of **aluminum** of AVOOO (99.99% A1) which were then anodically oxidized (anodized) in 4-n ... 25, and 27 v. The temperature of the electrolyte during the anodizing was maintained at about -- 2. The dimensions of the **oxide** cells are determined from photographs obtained with the electron microscope EM-3 with the aid of collodion and ...

MATTING OF ALUMINUM AND ITS ALLOYS Mar 17, 1967 18 pages

Authors: S. I. Shames; FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH

Full Text

The report covers a study of film formation kinetics and the properties of anodic **oxide** films produced in an oxalic acid electrolyte with the titanium salt TiO(KC2O4)2. 2H2O on **aluminum** AD-1 and Al alloys AMtsM and D16-T (unclad). Samples were wiped with benzine, chemically degreased (bath compositions ... , abrasive and friction wear, hardness, volume resistivity and dielectric strength characteristics of these films were better than for standard **oxide** films produced in sulfate or oxalate baths.

REFRACTIVE INDEX OF OPTICAL MATERIALS IN THE INFRARED REGION Jan 1970 250 pages

Authors: A. J. Moses; HUGHES AIRCRAFT CO CULVER CITY CA ELECTRONIC PROPERTIES INFORMATION CENTER

Full Text

Refractive index data and some extinction coefficients are provided for the infrared region for the following materials: silicon, germanium, zinc sulfide, cadmium telluride, zinc selenide, silica, calcium fluoride, magnesium fluoride, **aluminum oxide**, magnesium **oxide**, **aluminum**, gold and silver. The dependence of these optical constants on wavelength, temperature, crystal form, film preparation technique, radiation and other factors is included.

Hot Isostatic Pressing of Ceramic Powder Compacts Jan 15, 1986 174 pages

Authors: J. K. McCoy; A. J. Markworth; BATTELLE COLUMBUS DIV OH

Full Text

The densification of **aluminum oxide** in hot isostatic pressing has been studied in detail. Methods for calculating maps of densification rate as function of temperature and applied pressure have been developed. A new mechanism, interface-reaction-controlled grain-boundary diffusion, has been found which describes the densification of high-purity, fine-grained (grain radius of 0.7 micrometers) **aluminum oxide** powder at temperatures up to 1423 K. Theoretical models have been developed for this mechanism for both the initial and final stages of densification. Standard ...

Measurements of Sub-Micron AL203 Particles in Rocket Plumes Dec 1992 53 pages

Authors: John K. Vaughn; NAVAL POSTGRADUATE SCHOOL MONTEREY CA

Full Text

... the edges of plumes for solid propellant rocket motors using various propellants and motor geometries. The average values obtained for the **aluminum oxide** particles were a Sauter mean diameter of O.30+ or -.02 microns, ... 1.64 + or -.04 and standard deviation of 1.52+ or -.12 for the assumed monomodal, log-normal size distribution. The results indicated that the small **aluminum oxide** particles in the plume edge were gamma-AL203, independent of propellant composition, motor operating conditions and nozzle geometry. The good correlation ...

A Ceramic Fracture Model for High Velocity Impact May 1993 184 pages

Authors: William H. Cook; WRIGHT LAB EGLIN AFB FL ARMAMENT DIRECTORATE

Full Text

The objectives of this research program were to develop, implement, and demonstrate a failure model for **aluminum oxide** ceramic under impact loading. A comprehensive test program for Coors AD-85 was conducted ... types of experiments provided a basis for the development of the ceramic failure model. A phenomenological damage-based failure model for compressive fracture of impacted **aluminum oxide** was developed with emphasis placed on predicting fragment sizes of failed ceramic. Test data suggested a fragment size correlation with loading rate. A ...

Development of Materials for Spectral Hole Burning Applications Feb 28, 1994 27 pages

Authors: Chandra P. Khattak; John A. Lesiczka; Frederick Schmid; CRYSTAL SYSTEMS INC SALEM MA

Full Text

It was intended to evaluate growth of europium-doped yttrium **aluminum oxide** (Eu:Y3Al5O12, Eu:YAG) and europium-doped yttrium silicate (Eu:Y2SiO5, Eu:YSO) crystals to characterize these crystals for spectral hole-burning application. After ... is insufficient for choosing a crystal for spectral hole burning application. It is necessary to explore other rare-earth doped mixed **oxide** crystals and carry out more characterization. Spectral hole burning, Yttrium **aluminum** garnet, Heat exchanger method, Crystal growth, Dephasing time.

Stratospheric Ozone Reactive Chemicals Generated by Space Launches Worldwide Nov 1, 1994 34 pages

Authors: B. B. Brady; E. W. Fournier; L. R. Martin; R. B. Cohen; AEROSPACE CORP EL SEGUNDO CA TECHNOLOGY OPERATIONS

Full Text

We report quantities of inorganic chlorine compounds and **aluminum oxide** particles (Al203) deposited in the stratosphere and troposphere by solid rocket propelled launch vehicles. Totals are presented by launch vehicle type, ... H-1 and H-2). Whereas inorganic chlorine compounds released by solid rockets are directly related to stratospheric ozone depletion, much uncertainty surrounds reactivity of **aluminum oxide** particles. We also compare current and future effects of space launch on stratospheric ozone depletion with those of Ozone ...

Effects of pH, Surface Area, and Background Matrices on the Removal of Lead from Aqueous Solutions Using Activated Alumina Dec 5, 1999 129 pages

Authors: Patrick Wootton; AUBURN UNIV AL

Full Text

... precipitation and ion exchange have been used. These methods often do not yield sufficient removal of lead and can be expensive due to the high costs of required chemicals. **Aluminum oxide**, Al2O3, has been shown to sorb lead from aqueous solutions by concentrating lead at the particle surfaces. Sorption of lead using **aluminum oxide** (alumina) is effected by many factors, including PH, available surface area, and background compounds or matrices. Each of these variables significantly impacts both the rate of ...

Sampling Efficiency Measurement Methods for Aerosol Samplers Jan 2005 21 pages

Authors: Jana S. Kesavan; Jerold R. Bottiger; Robert W. Doherty; EDGEWOOD CHEMICAL BIOLOGICAL CENTER ABERDEEN PROVING GROUND MD RESEARCH AND TECHNOLOGY DIR

Full Text

... (1) monodisperse fluorescent/nonfluorescent Polystyrene Latex (PSL) microspheres with fluorometric analysis or Coulter Multisizer Analysis; (2) polydisperse solid **aluminum oxide** particles with Aerodynamic Particle Sizer (APS) analysis or Coulter Multisizer Analysis; (3) liquid fluorescent oleic acid particles with ... are generated using a Collison nebulizer, sonic nozzle, Ink Jet Aerosol Generator (IJAG), and puffers. **Aluminum oxide** particle aerosols are generated using a sonic nozzle. Fluorescent oleic acid particle aerosols are generated using a ...

Performance Characterization Methods of Aerosol Samplers Jul 1, 2003 8 pages

Authors: Jana S Kesavan; Robert W Doherty; Jerold R Bottiger; EDGEWOOD CHEMICAL BIOLOGICAL CENTER ABERDEEN PROVING GROUND MD

Full Text

... using the following methods: (1) monodisperse fluorescent/nonfluorescent PSL microspheres with fluorometric analysis or Counter analysis, (2) polydisperse solid **aluminum oxide** particles with APS analysis or Coulter Multisizer analysis, (3) fluorescent oleic acid particles with fluorometric analysis, and (4) ... nebulizer, sonic nozzle, Ink Jet Aerosol Generator (IJAG), and puffers. **Aluminum oxide** particles are generated using the sonic nozzle, fluorescent oleic acid particles are generated using the Vibrating Orifice Aerosol Generator ...

Effects of Differing Carbon Nanotube Field-effect Transistor Architectures Jul 2009 22 pages

Authors: Andrew M Dorsey; Matthew H Ervin; ARMY RESEARCH LAB ADELPHI MD SENSORS AND ELECTRON DEVICES DIRECTORATE

Full Text

... (SWCNTFETs) were fabricated with varying device architectures. Variations on the standard back-gated architecture included varying the gate **oxide** material and thickness, changing source and drain contact metallization, suspending the carbon nanotubes to minimize interaction with the gate **oxide**, and fabricating a topgated architecture employing a thin layer of **aluminum oxide** (Al2O3) as the gate **oxide**. Devices were characterized and compared to each other based on the CNTFET properties of noise, hysteresis, sub-threshold slope, and ...

Metal Slurry Droplet and Spray Combustion Sep 15, 1993 219 pages

Authors: W. A. Sirignano; R. Bhatia; CALIFORNIA UNIV IRVINE DEPT OF MECHANICAL AND AEROSPACE ENGINEERING

Analytical and numerical studies on n-octane and **aluminum** metal slurry droplet combustion and metal slurry ... in spray combustion calculations. An analytical model describes the combustion of **aluminum** particles in air. The

Full Text

particle transient heating, the ... of parallel droplet streams. Without forced convection and preheat of the ambient air to temperatures near the **aluminum oxide** melting point, the flame does not possess sufficient energy to ignite the metal. Ignition ... . Metal slurry vaporization; metal slurry combustion; **aluminum** particle combustion; **aluminum** particle burning; slurry droplets and ...

Development and Control of Porosity in Al2O3/AlPO4 Coatings Feb 24, 1997 10 pages

Authors: Larraine F. Francis; MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMICAL ENGINEERING AND MATERIALS SCIENCE

Full Text

This report describes a new method for low temperature preparation of porous ceramic coatings. A reaction between **aluminum oxide** and phosphoric acid is used to bind particles together and control porosity. Porous ceramic coatings ... by the relative amount of acid and hence relative amount of **aluminum** phosphate reaction product. The addition of **aluminum** chloride to the dispersion led the formation of fine **aluminum** hydroxide precipitates which react with phosphoric acid at lower temperatures to form **aluminum** phosphate; these fine reaction products help to bind the ...

Fretting Wear-Resistant, Micro-Arc Oxidation Coatings for Aluminum and Titanium Alloy Bearings (Preprint) Mar 2007 23 pages

Authors: K. J. Choppy; R. F. Kovar; B. M. Cushman; INFOSCITEX CORP WALTHAM MA

Full Text

... a SBIR contract, and has been released to the public by Infoscitex. **Aluminum** and titanium alloys are used as replacements for steel in gear ... these metals. Infoscitex applied a proprietary micro-arc oxidation process to produce hard, thick, and adherent **oxide** coatings on **aluminum** and titanium alloys that rendered the coated metal components resistant to fretting type wear. Selected **aluminum** and titanium alloy test specimens were micro-arc treated then ... test cycles. The results of efforts to improve the fretting wear resistance of **aluminum** and titanium alloy bearings for use in aircraft gear box ...

Holographic Investigation of Solid Propellant Combustion Dec 1988 56 pages

Authors: Albert G. Butler; NAVAL POSTGRADUATE SCHOOL MONTEREY CA

Full Text

... obtained from the holograms. From these data, the mean diameters (D32) of the larger particles were calculated and utilized to compare what effects pressure, location in the motor and **aluminum** content had on the behavior of the **aluminum**/**aluminum oxide** particles. D32 was found to decrease with increasing pressure, but was unaffected by variations in low values of propellant **aluminum** loading. D32 at the grain exit was found to be significantly less than within the grain port.

Investigation of the Effects of Solid Rocket Motor Propellant Composition on Plume Signature Jun 16, 1994 65 pages

Authors: Clay J. Snaza; NAVAL POSTGRADUATE SCHOOL MONTEREY CA

Full Text

Three propellants with **aluminum**/silicon weight percentages of 18/0%, 13.5/4.5%, and 12/6% were fired in a subscale motor to determine if the ... small diameters (less than 1.93 micrometers) were present with any significant volume. Replacing a portion of the **aluminum** in a highly metallized solid propellant with silicon was found to eliminate the Al2O3 in favor of ... the smoke (particles with diameters less than 2 micrometers) they could account for only approximately 10% of the article volume. Solid rocket, **Aluminum oxide**, Infrared signature, **Aluminum**/Silicon propellant, Particle size distribution

The Effect of Solid Propellant Binder on the Formation and Evolution of Aluminum Combustion Products Jun 1996 84 pages

Authors: V. E. Zarko; O. G. Glotov; V. V. Karasev; M. V. Beckstead; BRIGHAM YOUNG UNIV PROVO UT

Full Text

... propellant and an energetic binder (EB) propellant. Both contained 18% **aluminum** and 37% coarse AP in order to provide very similar ... structures, and both propellants had essentially common burning rates. The **aluminum** combustion efficiency is higher and the characteristic agglomerate size is significantly ... that similar sized agglomerates can differ significantly in structure and **aluminum** content, and there is some indication of internal voids (i.e. ... to when they initially form at the surface. The size distribution of fine **oxide** particles was not dependent on either pressure or the propellant binder ...

Structure and Properties of Polymers and Organosilanes Adsorbed Onto Oxidized Aluminum and Titanium Jul 15, 1983 37 pages

Authors: F. James Boerio; CINCINNATI UNIV OH DEPT OF MATERIALS SCIENCE AND METALLURGICAL ENGINEERING

Full Text

... of thin films formed by gamma- aminopropyltriethoxy-silane (gamma-APS) adsorbed from aqueous solutions onto titanium, **aluminum**, and iron was determined and related to the properties of the films as ... for improving the wet strength of adhesive bonds between epoxy resins and titanium, **aluminum**, and iron adherends. Gamma-APS was adsorbed onto iron and titanium as hydrolyzed oligomers ... was concluded that the properties of the films depeneded more on the orientation of the gamma-APS molecules at the **oxide** surface than on the overall structure of the films. The orientation of the adsorbed gamma-APS ...

Ductile Alloy Encapsulated Ceramic Armor Development Jan 1990 68 pages

Authors: Susan M. Abkowitz; Paul Weihrauch; Stanley Abkowitz; Stephen A. Mariano; Dino J. Papetti; DYNAMET TECHNOLOGY INC BURLINGTON MA

Full Text

... in the repair and maintainability of armored vehicles. The report describes the details of the optimized P/M cladding process of ceramics with titanium and **aluminum** base materials. Also described are efforts to evaluate and enhance the quality and strength of the bonding between the ceramics and strength of the ... and the metal cladding. Results of ballistic testing of different armor designs against .30 caliber and .50 caliber armor piercing threats are reported. Keywords: Titanium boride; **Aluminum oxide**; Silicon carbide; Titanium alloys; **Aluminum** alloys; Ceramic armor; Vehicular armor. (EDC)

Advanced Zinc Phosphate Conversion and Pre-Ceramic Polymetallosiloxane Coatings for Corrosion Protection of Steel and Aluminum, and Characteristics of Polyphenyletheretherketone-Based Materials Sep 24, 1992 12 pages

Authors: T. Sugama; N. R. Carciello; BROOKHAVEN NATIONAL LAB UPTON NY DEPT OF APPLIED SCIENCE

Full Text

... to alkali-induced dissolution. The factors governing the film-forming performance of preceramic polymetallosiloxane (PMS) coatings for **aluminum** (Al) substrate surfaces were investigated. Four factors were important in obtaining a ... phases; and (4) the formation of interfacial oxane bond between PMS and Al **oxide**. The formation of well-crystallized polyphenyletheretherketone (PEEK) in the vicinity of silica aggregates was found in the ... C, and the resistance in 5 wt% H2S04 solution at 80 deg C. anhydrous zinc phosphate, steel, corrosion, polymetallosiloxane, **aluminum**, polyphenyletheretherketone.

Processing of Nanocrystalline Nitrides and Oxide Composites Dec 31, 1998 5 pages

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

Full Text

... begun to investigate the chemical composition, specifically oxygen contamination, and sintering behavior of the nanocrystalline **aluminum** nitride synthesized in the forced flow reactor. Our initial results from these studies show that nanocrystalline **aluminum** nitride can be produced with high purity (<4 wt% oxygen), and that full densification can be achieved without the use of sintering aids. In addition, hot pressed compacts of nanocrystalline **aluminum** nitride show an unusual degree of texturing after sintering, which may make these materials ...

Structure and Properties of Aluminum Nitride and AlON Ceramics May 2002 30 pages

Authors: James W. McCauley; ARMY RESEARCH LAB ABERDEEN PROVING GROUND MD WEAPONS AND MATERIALS RESEARCH DIRECTORATE

Full Text

A brief review of **aluminum** nitride and AlON ceramics is presented in the context of the pseudobinary **aluminum** nitride-aluminum **oxide** phase equilibrium system. AlON is the name applied to the nitrogen stabilized cubic spinel in this system, with a composition centered at 35.7 mole-percent AlN. First, the phase equilibria and crystal chemistry of these phases are presented, focusing on a constant anion oxynitride spinel model and the various phases, including polytypoids, in this system. Then, a brief summary is given on the processing and ...

Adhesion of HVOF Sprayed Diamond-Containing Nanostructured Composite Coating 2003 6 pages

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

Full Text

In the present paper mechanical properties of HVOF sprayed diamonds-containing **aluminum oxide** composite coating have been investigated. Crystallographic and morphologic texture was measured. Diamonds nanoparticles may improve fracture resistance of **aluminum** oxide-based coating. Investigations of thermally sprayed coatings by the test revealed high accuracy speed and reliability of the test. It is also thought that the composite coatings will have better thermal conductivity and thermal shock resistance than that of **aluminum** oxide-based coatings.

MACHINING OF REFRACTORY MATERIALS May 1963 361 pages

Authors: Michael Field; William P. Koster; John V. Gould; Norman Zlatin; METCUT RESEARCH ASSOCIATES INC CINCINNATI OH

Full Text

... machining characteristics were determined for unalloyed tungsten, molybdenum, columbium and tantalum alloys, Rene 41, B-120VCA titanium, D6AC steel quenched and tempered to 52-58 Rc, Refrasil, Pyroceram, zirconium **oxide** and **aluminum oxide** coatings. The selection of this group, is the result of a field survey. This report presents the recommendations for machining these materials. It should be noted that even small deviations in cutting speeds, feed, cutting fluids, tool ...

Secondary Electron Emission of Certain Ceramics and Antidynatron Coatings, Jun 30, 1974 5 pages

Authors: Yu. G. Malynin; ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE VA

Full Text

The possibility of reducing the coefficient of secondary electron emission of **aluminum oxide** ceramics by applying coatings of boron nitride-vanadium **oxide** to their surfaces was investigated. Data are presented showing that the values of the coefficient for these ceramics, used in power taps of powerful superhigh frequency devices are dangerously high, with respect to increase in secondary electron discharge. Coatings with various proportions of boron nitride and V2O5 effectively reduce the coefficient of secondary electron emission.

Supersonic Pyrolysis Jets for Diamond Film Deposition May 22, 1991 11 pages

Authors: Peter Chen; HARVARD UNIV CAMBRIDGE MA DEPT OF CHEMISTRY

Full Text

... design, and the engineering of specific radical precursors. We have constructed and tested new higher-temperature ceramic Zirconium **Oxide** and Silicon Carbide pyrolysis nozzles that can operate continuously at 1700 C for several hours. The two successful designs were used to generate intense beams of hydrocarbon radicals and carbenes by thermal decomposition of appropriate precursors that were inaccessible with our previous **Aluminum Oxide** designs. The new nozzle design makes possible quantitative sequential homolytic cleavage of a Carbon-Bromine bond to generate a radical, or two C-Br bonds ...

Template-Synthesis of Infrared-Transparent Metal Microcylinders: Comparison of Optical Properties with the Predictions of Effective Medium Theory Jul 20, 1992 39 pages

Authors: C. A. Foss Jr.; M. J. Tierney; C. R. Martin; COLORADO STATE UNIV FORT COLLINS DEPT OF CHEMISTRY

Full Text

Metal-insulator composites of varying metal volume fraction have prepared by electrochemical deposition of gold into porous, **aluminum oxide** membranes. The cylindrical pore array structure of the host **oxide** serves as a template for the formation of Au particles ca. 0.26 gm in diameter with lengths ranging from 0.3 gm to 3 gm depending on deposition time. The composites display a significant transparency in the infrared spectrum between 2000 and 4000 cm- 1. The Au volume fraction and effective medium theory screening ...

Controlled Heterogeneous Nucleation of Melt-Textured YBa2Cu3O6+x by Addition of Al2O3 Particles 1992 20 pages

Authors: Yan L. Chen; Lijie Zhang; Helen M. Chan; Martin P. Harmer; LEHIGH UNIV BETHLEHEM PA

Full Text

... alumina particles, it was found that nucleation and growth of 123 occurred exclusively at the particles. A reaction sequence for the formation of the Ba6y2A14015 is put forward, together with a discussion of the possible nucleation mechanisms for the 123. Yttrium Barium Copper **Oxide**(YBCO), Peritectic, Melt-texturing, Nucleation, Barium Yttrium **Aluminum Oxide** (Ba6y2A14015)

Processing and Characterization of Porous Oxide Coatings Feb 24, 1997 6 pages

Authors: Lorraine F. Francis; MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMICAL ENGINEERING AND MATERIALS SCIENCE

Full Text

The goals of this research project were to develop processing methods for fabrication of porous **oxide** coatings with a range of pore contents and to develop characterization methods for porous coatings. Research focused on controlling porosity in coatings prepared ... into three categories: (1) development and control of porosity in alkoxide-derived titania coatings; (2) characterization of macroporous coatings and (3) porosity in alumina/ **aluminum** phosphate coatings. Two categories of results concern the development of new processing methods for ceramic coatings and the scientific understanding of ...

High-Efficiency Heterojunction Photovoltaic Devices by Block Copolymer Nanotemplates Aug 2005 24 pages

Authors: Jin K. Kim; Jeong I. Lee; Jeong A. Jang; Unyong Jeong; POHANG UNIV OF SCIENCE AND TECHNOLOGY (KOREA SOUTH) DEPT OF CHEMICAL ENGINEERING

Full Text

... and poly (3-hexyl thiopene) (P3HT) nanowires with diameters of 10~25 nm were prepared on indium-tin **oxide** coated glasses (ITO) by electropolymerization of the monomers inside nanoporous templated prepared by block copolymers. These high density ... conducting polymer nanowires persisted without collapsing the wire onto the substrate. Such structures could not be achieved by the electropolymerization of a conducting polymer inside an anodized **aluminum oxide** (AAO) membrane, where the nanowires were found to fall onto the substrate after the AAO was removed. After removal of the PS matrix, the HOMO ...

A Comparison of Bulk Precipitated Cerium Oxide Powders and Cerium Conversion Coatings and the Influence of Hydrogen Peroxide on Their Formation (Preprint) Mar 2006 23 pages

Authors: S. A. Hayes; P. Yu; T. J. O'Keefe; J. O. Stoffer; MISSOURI UNIV-ROLLA

Full Text

To better understand the role of hydrogen peroxide in the formation of cerium conversion coatings and precipitates, hydrated cerium **oxide**/hydroxide materials obtained from aqueous solutions have been characterized by thermogravimetic methods, X-ray diffraction, and scanning electron microscopy. Powders were prepared by precipitation with ... conversion coating and the cerium precipitates formed by using hydrogen peroxide as an oxidant. Lastly, the effect of hydrogen peroxide in the cerium conversion coating process is considered from the standpoint of corrosive attack on the **aluminum** substrates.

Low-Cost Deposition Methods for Transparent Thin-Film Transistors Sep 26, 2003 188 pages

Authors: Benjamin J. Norris; OREGON STATE UNIV CORVALLIS

Full Text

... MV=cm, 12.1?13.5, 0.411%, and 17.37 nA=cm2, respectively. Additionally, ZnO TTFTs constructed using spin-coated HfO2 gate insulators possess electrical characteristics similar to those obtained with **aluminum oxide** and titanium **oxide** superlattice "ATO" gate dielectrics. A second objective of this dissertation is to demonstrate a novel photolithography processing method for ZnO TTFTs with critical dimensions as small as 25 ?m. Lithography patterning of ...

Kinetics of Oxidation of Ni Aluminide Exposed to Oxygen-Sulfur Atmospheres 1987 8 pages

Authors: K. Natesan; ARGONNE NATIONAL LAB IL

Full Text

... were conducted using a scanning electron microscope equipped with an energy dispersive x-ray analyzer and an electron microprobe; the air-exposed specimens developed predominantly nickel **oxide**; the specimen exposed to a low PO2 environment developed an **aluminum oxide** scale; as the sulfur content of the gas mixture increased, the alumina scale exhibited spallation and the alloy tended to form nickel sulfide as the reaction phase; the results indicated that the ...

REGULARITIES OF DISPERSION OF ENDURANCE LIMIT OF STRUCTURAL ALUMINUM ALLOY (ZAKONOMERNOSTI RASSEYANIYA PREDELA VYNOSLIVOSTI KONSTRUKTSIONNOGO ALYUMINIEVOGO SPLAVA), May 8, 1967 20 pages

Authors: M. N. Stepnov; FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Full Text

Gauss and Weibull distribution functions are used for calculating the distribution of endurance limits for **aluminum** AV structural alloy. The calculations are based on the results of endurance tests of 1510 specimens 8 mm in diameter subjected to cantilever ... in the degree of recrystallization of the alloy reduces the mean endurance limit and noticeably increases the scatter in endurance characteristics. Contamination of the alloy by **oxide** films has a similar effect on the endurance characteristics. Therefore, it is extremely important to use an

alloy with a nonrecrystallized structure for ...

Factors Effecting the Performance of Diagonal Conducting Wall Open Cycle MHD Generators, Feb 1971 19 pages

Authors: Y. C. L. Wu; L. Crawford; R. Shanklin; J. Muehlhauser; D. Molnar; TENNESSEE UNIV SPACE INST TULLAHOMA

Full Text

... the generator power output decreases by 15 percent over the entire load spectrum. Other studies involving gross generator behavior include an investigation of the effect resulting from the deposit of **aluminum oxide** and other combustion materials on the walls of the generator. No deterioration of performance was noted during this process. The addition of the powdered **aluminum** improved the generator performance. During the course of the experimental study, it was found that both the injector head and ...

Grain Boundary Segregation and Stress Corrosion Cracking of Aluminum Alloys Nov 1976 30 pages

Authors: J. A. Green; R. K. Viswanadham; T. S. Sun; W. G. Montague; MARTIN MARIETTA LABS BALTIMORE MD

Full Text

Auger electron spectroscopy and chemical depth profiling by argon sputtering were employed to obtain the grain boundary segregation profiles of various **aluminum** alloys. Samples of both commercial (7075, 7050, and 7049) and high purity alloys based on the Al-Zn-Mg ternary in different heat treatments were examined ... in Mg and Zn. In commercial alloys, however, the grain boundaries are depleted in the minor elements Fe, Cu and Si. AES spectra of **oxide** films formed on Al-Zn-Mg alloys indicate that the enhanced segregation along the grain boundaries results in a film rich in Mg. It is postulated ...

Scanning Photoacoustic Microscopy of Aluminum with Aluminum Oxide, Roughness Standards and Rubber Jun 1984 53 pages

Authors: R. L. Thomas; L. D. Favro; P. K. Kuo; D. N. Rose; D. Bryk; WAYNE STATE UNIV DETROIT MI

Full Text

Thermal wave imaging of coated samples, surface geometries of homogeneous samples, and dispersed particles in rubber samples are presented and discussed. Preliminary results of color-encoding of images are encouraging. Further photothermal (infrared radiation) detection studies of the coated graphite samples are recommended, along with more detailed study of numerical analysis of surface roughness applications. Preparation of rubber samples containing layer defects is also recommended.

X-Ray Diffraction Studies of Evaporated Gold Thin Films Deposited on Aluminum Nitride Substates Mar 24, 1994 71 pages

Authors: Clifford B. Munns; NAVAL POSTGRADUATE SCHOOL MONTEREY CA

Full Text

X-ray diffraction was utilized to determine the root mean square (r. m.s.) strains and average particle sizes in evaporated gold thin films on **aluminum** nitride substrates as a function of substrate surface condition prior to deposition. The substrate treatments evaluated were surface roughness, use of titanium and chromium inter-layers, presence of an **oxide** layer on the substrate surface and vacuum conditions used during deposition. The Warren-Averbach method was utilized to obtain the r.m.s. strains and particle sizes ...

Adherend Surface Effects on Epoxy Cure by NMR May 11, 1994 12 pages

Authors: Paul T. Inglefield; CLARK UNIV WORCESTER MA

Full Text

... on the different products and different kinetics which result from the presence of an active surface. The major system considered is that based on the diglycidyl ether of bisphenol A cured with primary amines, in particular 4,4' diaminodiphenyl sulfone. **Aluminum oxide** is used as a high surface area model of **aluminum** adherend surfaces. The NMR experiments utilize line narrowing techniques to yield resolved spectra of the solid materials. 13C and 15N NMR are used to identify the ...

Adherend Surface Effects on Epoxy Cure by NMR May 11, 1994 12 pages

Authors: Paul T. Inglefield; CLARK UNIV WORCESTER MA

Full Text

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Application of Aluminum, Copper and Gold Electrodes in AC Polymer Light- Emitting Devices Sep 20, 1997 10 pages

Authors: H. L. Wang; F. Huang; A. G. MacDiarmid; Y. Z. Wang; D. D. Gebler; OHIO STATE UNIV COLUMBUS DEPT OF PHYSICS

Full Text

... M/EB/P/EB/ITO, where M=Al, Cu or Au, EB=polyaniline (emeraldine base), P=poly(2,5-dihexadecanoxy phenylene vinylene pyridyl vinylene) or PPV-PPyV, and ITO = indium-tin **oxide** glass, show electroluminescent properties in both forward and reverse bias modes. In the absence of emeraldine base, in the case of **aluminum** and copper, electroluminescence is observed only in the forward bias mode; in the case of gold no electroluminescence is observed in either forward or reverse bias ...

Ion Beam Enhanced Deposition as Alternative Pretreatment for Adhesive Bonding of Aircraft Alloys Jun 23, 1994 20 pages

Authors: Gerhardus H. Koch; Arnold H. Deutchman; CORTEST COLUMBUS TECHNOLOGIES OH

Full Text

Surface treatment of **aluminum** alloys based on wet chemical processes is subject to increasing regulations. The objective of the work described in this paper was to demonstrate the feasibility of applying a non-chemical technique to generate an **aluminum oxide** surface with adhesive bonding properties comparable to that generated with the traditional technique. This paper describes the use of ion beam enhanced deposition which

meets the objective of this work.

Application of the Depth-of-Penetration Test Methodology to CharacterizeCeramics for Personnel Protection Apr 2000 43 pages

Authors: Thomas J. Moynihan; Shun-Chin Chou; Audreyk L. Mihalcin; ARMY RESEARCH LAB ABERDEEN PROVING GROUND MD

Full Text

... report adapts this technique to evaluate armor ceramics for personnel protection using the caliber .30 armor-piercing M2 (APM2) and armor-grade **aluminum** alloy 5083 (Al 5083), MIL-A-46027, as the backing material. Penetration of the APM2 into monolithic Al 5083 was determined over a range of velocities. Several thicknesses of boron carbide (B4C), silicon carbide (SiC), and **aluminum oxide** (Al2O3) were tested to determine ballistic performance as a function of ceramic areal density. Projectile cores were recovered and analyzed. Postmortem condition of the cores was ...

Pulsed Motor Firings Aug 2000 50 pages

Authors: Fred S. Blomshield; NAVAL AIR WARFARE CENTER WEAPONS DIV CHINA LAKE CA

Full Text

Combustion stability additives like zirconium carbide (ZrC), **aluminum oxide** (Al2O3), and zirconium ortho-silicate (ZrSiO4) have long been known to suppress combustion instability in reduced smoke, composite propellant solid rocket systems. Often, as little as 0.5% ... , the 3% propellant used before will be used again, except 3% HMX will be used in one formulation and 3% ultra fine **aluminum** or ALEX will be used in another. The emphasis here is to examine the combustion response changes. This paper will present the results of ...

Oxidation Processes on Aluminum and Rhodium Mar 17, 2004 9 pages

Authors: Andrew M. Rappe; PENNSYLVANIA UNIV PHILADELPHIA DEPT OFCHEMISTRY

Full Text

... monolayers. We have completed the first major theoretical study of Pt chemisorbed on alumina. We contrast Pt nanoparticle and layer adsorption, focusing on how **oxide** defects influence the Pt growth, and the CO chemisorption properties on the nanoparticles. We have completed an initial demonstration that our new formulation of atomic ... on the noble metals, demonstrating how changes in metal electronic structure give rise to different overlayers. We also completed the first study of thiol chemisorption on **aluminum**, computationally demonstrating that thiols strongly inhibit O2 chemisorption on Al.

Temporal Evolution of the LIBS Spectrum of Aluminum Metal in Different Bath Gases Dec 2004 30 pages

Authors: Thuvan N. Piehler; Frank C. DeLucia Jr.; Chase A. Munson; Barrie E. Homan; Andrzej W. Miziolek; ARMY RESEARCH LAB ABERDEEN PROVING GROUND MD WEAPONS AND MATERIALS RESEARCH DIRECTORATE

Full Text

The spectral emission of gas phase **aluminum** (Al) and Al **oxide** was measured during and immediately after exposure of a bulk Al sample to a laser- induced spark produced by a focused. pulsed laser beam (Nd:YAG, 10 ns pulse duration, 35 mJ/pulse lambda = 1064 nm). The spectral emission was measured as a function of time after the onset of the laser pulse. and was also measured in different bath gases (air, N2, O2. and He).

Using Plasticity Values Determined from Systematic Hardness Indentation Measurements for Predicting Impact Behavior in Structural Ceramics: A New, Simple Screening Technique Dec 2008 7 pages

Authors: James W McCauley; Trevor E Wilantewicz; ARMY RESEARCH LAB ABERDEEN PROVING GROUND MD

Full Text

... alone measured at a single load. In this work, several methods for curve fitting hardness-load data have been compared for both Knoop and Vickers hardness on several ceramic materials: **aluminum** oxynitride (AlON), silicon carbide, **aluminum oxide** and boron carbide. A power-law equation (H = kF[exp c]) is shown to fit the Knoop data quite well. A plot of log10 (HK) vs. log10 (F) yielded easily comparable straight lines, whose slope and intercept ...

Using Plasticity Values Determined From Systematic Hardness Indentation Measurements for Predicting Impact Behavior in Structural Ceramics: A New, Simple Screening Technique Sep 2009 16 pages

Authors: James W McCauley; Trevor E Wilantewicz; ARMY RESEARCH LAB ABERDEEN PROVING GROUND MD WEAPONS AND MATERIALS RESEARCH DIRECTORATE

Full Text

... alone measured at a single load. In this work, several methods for curve fitting hardness-load data have been compared for both Knoop and Vickers hardness on several ceramic materials: **aluminum** oxynitride (AlON), silicon carbide, **aluminum oxide** and boron carbide. A power-law equation (H = kFc) is shown to fit the Knoop data quite well. A plot of log10 (HK) vs. log10 (F) yielded easily comparable straight lines, whose slope and intercept data ...