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Burning Characteristics of Individual Aluminum/Aluminum Oxide Particles Jun 20, 1996 49 pages

Authors: Eric C. Ruttenberg; NAVAL POSTGRADUATE SCHOOL MONTEREY CA

Full Text

... in which the burning characteristics of individual **aluminum**/**aluminum oxide** particles were measured using a windowed combustion bomb at atmospheric pressure and under ... scanning electron microscope (SEM) was used to measure the size distribution of the initial **aluminum** particles and the ... **oxide** residue. Analysis of the residue indicated that the mass of **aluminum oxide** contained in particles larger than 12 ... measured particle size distributions and photomicrographs implied that the burning **aluminum** particles periodically expel **aluminum oxide** fragments with sizes between 14 and 36 microns ...

Single Particle Studies of Heterogeneous Atmospheric Chemistry on Aluminum Oxide Particles in a Quadrupole Trap Mar 2000 89 pages

Authors: A. J. Hunter; D. M. Sonnenfroh; D. B. Oakes; W. T. Rawlins; PHYSICAL SCIENCES INC ANDOVER MA

Full Text

... experimental investigation employs a laboratory quadrupole trap electrodynamic levitation apparatus to study heterogeneous processes on single **aluminum oxide** particles representative of those exhausted into the atmosphere by ... rocket motors. We have investigated the activities of different types of **aluminum oxide** particles for uptake of gas-phase H2O and HCl. The particle types investigated were alpha-Al2O3, gamma-Al2O3, H2SO4- treated alpha-Al2O3, H2SO4-treated gamma-Al2O3, and metastable **aluminum oxide** formed by rapid cooling from molten Al2O3 in a shock ...

Heterogeneous Reactions on Aluminum Oxide Surfaces Modeling Rocket Exhaust Particles Jan 14, 1999 9 pages

Authors: Steven M. George; COLORADO UNIV AT BOULDER DEPT OF CHEMISTRY AND BIOCHEMISTRY

Full Text

... by H2O led to one additional manuscript that is still under review. Since the conclusion of this research grant, we have continued to examine the surface chemistry of amorphous Al2O3 surfaces. **Oxide** surface chemistry is still a largely unexplored area. Our surface reactivity studies have helped to define this new territory in surface science. These studies have also improved our understanding of heterogeneous reactions on **aluminum oxide** rocket exhaust particles in the atmosphere.

Optical and Etching Studies of Native Aluminum Oxide Layers for Use in Microcavity Photonic Devices Mar 2001 137 pages

Authors: William L. Bernhard; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH SCHOOL OF ENGINEERING

Full Text

... within microcavity devices. Only then is it possible to accurately model and analyze structures. Microcavity structures incorporating a high **aluminum** content AlGaAs layers are designed, grown, processed, and measured. The processing of these devices includes the conversion of high aluminum-content AlGaAs layers to native **aluminum oxide** (AlO) layers through the process of thermal oxidation. This selective conversion of microcavity layers provides for the necessary electrical and optical confinement required to produce a plethora ...

Studying the Effect of a Change in Aluminum Oxide Content on the Physicochemical Properties of Dolomite Opacified Glazes, Jun 16, 1972 8 pages

Authors: Kh. Yunusov; I. Azimov; S. Tashkhodzhaev; N. A. Parpiev; FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Full Text

The effect of **aluminum oxide** on the quality of glasses and glazes is known. However, its effect on the physicochemical properties of glazes in which the thinly dispersed crystalline phases of silicon compounds of alkaline-earth metals are formed has not been studied. Thirteen compounds in which the Al2O3 content varied from 4 to 20 wt. % due to the proportional change in the remaining composite components of the original glaze were studied on the basis of the original glaze. (Author)

Time-Dependent and Light-Induced Fading in Victoreen Model 2600-80 Aluminum Oxide Thermoluminescence Dosemeters 1993 8 pages

Authors: J. H. Musk; ARMED FORCES RADIOBIOLOGY RESEARCH INST BETHESDA MD

Full Text

In the absence of light, the thermoluminescence (TL) signal of irradiated **aluminum oxide** TL dosemeters (TLD) faded by 21% in 3 months. When exposed to low intensity incandescent light. the TL signal decreased by 25% in 6 h. High intensity fluorescent light caused the TL signal to fade by more than 90% in 6 h.

Stratospheric Chemistry of Aluminum Oxide Particles Jun 1994 13 pages

Authors: Roger Meads; Darryl Spencer; Mario J. Molina; MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF EARTH ATMOSPHERIC AND PLANETARYSCIENCES

Full Text

The emissions from solid rocket motors (SRMs) include hydrogen chloride vapor (MCi) and other inorganic chlorine compounds, as well as **aluminum oxide** particles. The effects of these emissions on stratospheric ozone have been investigated by Prather et al. Pyle and others. Recent satellite observations show no measurable localized depletion of ozone following a Space Shuttle launch; nevertheless, it is possible for the effects to be quite pronounced in the immediate neighborhood of the rocket plume.

Enhanced Performance of Bipolar Cascade Light Emitting Diodes by Doping the Aluminum Oxide Apertures Nov 2004 10 pages

Authors: William J. Siskaninetz; J. E. Ehret; J. A. Lott; J. C. Griffith; T. R. Nelson Jr; AIR FORCE RESEARCH LAB WRIGHT-PATTERSON AFB OH SENSORS DIRECTORATE

Full Text

Performance improvements in multiple-stage, single-cavity bipolar cascade light emitting diodes including reduced operating voltages, enhanced light generation, and reduced device heating are obtained by doping intracavity **aluminum oxide** apertures with silicon. This doping results in a reduced electron energy barrier and therefore a reduced series resistance which leads to better power and heating characteristics. Nearly 50% reductions in operating ...

In Vitro Toxicity of Aluminum Nanoparticles in Rat Alveolar Macrophages Mar 2006 10 pages

Authors: Andrew Wagner; Charles Bleckmann; E. England; Krista Hess Saber /Hussain; John J. Schlager; AIR FORCE RESEARCH LAB WRIGHT-PATTERSON AFB OH HUMAN EFFECTIVENESS DIRECTORATE

Full Text

... vitro cellular effects of exposing rat lung macrophages to **aluminum oxide** nanoparticles (30 and 40nm average size) compared to **aluminum** metal nanoparticles (50, 80, and 120nm). ... high as 500 microg/ml for 24 hours with **aluminum oxide** nanoparticles. However, there was significant delayed toxicity ... at 96 and 144 h post exposure. Exposure to **aluminum** metal nanoparticles indicated slight to moderate toxicity after ... was significantly hindered by exposure to all tested **aluminum** nanoparticles at 25 microg/ml for 24 hours, but not by the **aluminum oxide** nanoparticles. A series of cytokine and nitric ...

New Approaches to Aluminum Passivation for Corrosion Prevention Oct 10, 1997 27 pages

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

Full Text

A new method has been discovered for producing a corrosion-resistant **aluminum oxide** film on **aluminum** surfaces. The method employs the electronic activation of adsorbed water molecules on the **aluminum** surface, using electron- bombardment. The artificial **oxide** film, so produced, exhibits about 25 times higher electrical impedance using electrochemical measurements compared to **aluminum oxide** films made by conventional oxidation.

In Vitro Toxicity of Aluminum Nanoparticles in Rat Alveolar Macrophages Mar 2006 111 pages

Authors: Andrew J. Wagner; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING AND MANAGEMENT

Full Text

The purpose of this research is to characterize the in vitro cellular effects of rat lung macrophages to exposure to **aluminum oxide** nanoparticles (Al2O3-NP) (30 and 40nm) compared to **aluminum** nanoparticles (Al-NP) (50, 80, and 120nm). This study concentrates on cell viability, mitochondrial function, phagocytosis ability, and ... the Al-NP at 25 µg/ml for 24 hours, but not by the Al2O3-NP. A series of cytokine and nitric **oxide** assays performed show none of these **aluminum** nanoparticles are inducing an inflammatory response.

Probing Metal Cluster and Metal Oxide Cluster Interactions with Organo- Sulfur and Organo-Phosphorous Molecules using Mass Spectrometry and Anion PES Oct 30, 2002 6 pages

Authors: Caroline C. Jarrold; INDIANA UNIV AT BLOOMINGTON DEPT OF CHEMISTRY

Full Text

Mass spectrometry anion photoelectron spectroscopy and density functional theory calculations have been applied to several **aluminum oxide** cluster complexes. The reactivity of several "magic" clusters (i.e. those species that dominate the mass spectrum) toward water and methanol has been explored and for one system ... with the intent that they will be applied in the future to transition metal disulfide cluster systems. Preliminary results on the spectra of larger hypermetallic **aluminum oxide** clusters are presented.

In Situ Surface Studies Of Conversion Coatings For Steel And Aluminum Nov 10, 1992 27 pages

Authors: Henry W. White; Florian Mansfeld; Paul Bryant; MISSOURI UNIV-COLUMBIA

Full Text

The primary goals of the work were to develop mechanisms of corrosion protection for cerium based surface layers on **aluminum** alloys and on polyacrylic acid (PAA) complexed zinc phosphate conversion coatings on steel. Atomic force. microscopy ... developed and applied to several problems. The cerium based coatings on Al 6061-T6 are shown to consist of two principle components--a poorly ordered monohydrated **aluminum oxide**, and an insoluble cerium **oxide** which forms at areas concentrated with impurities and alloying elements. Electrochemical action during the surface modification process fosters the ...

Quasicrystalline Films for Tribological Applications: Role of Stoichiometry Microstructure Transformation Kinetics and Oxide Structure and Chemistry Jun 30, 2004 48 pages

Authors: David Palaith; TECHNOLOGY ASSESSMENT AND TRANSFER INC ANNAPOLIS MD

... , despite encapsulation in argon atmosphere. Fluctuation microscopy and other structural analysis showed the presence of an ordered, polycrystalline **oxide** on the surface of AlCuFe films annealed at 500 degree to 600 degree. This **oxide** film appeared to consist of **aluminum oxide**, and lacked copper and iron. The combination of

Full Text microstructure analysis, phase development on annealing, and analysis of the **oxide** phase provided fundamental understanding of AlCuFe quasicrystalline coatings in steam engine applications. A tribological testing system capable ...

Sol-Gel Derived Surface Treatments for Aircraft Aluminum Alloys Mar 2002 39 pages

Authors: Edward T. Knobbe; OKLAHOMA STATE UNIV STILLWATER

Full Text ... for providing enhanced corrosion resistance for 2024-T3 **aluminum** alloy were investigated. This program investigated: ... surface modification of structure and composition of 2024-T3 **aluminum** alloy. Environmental scanning electron microscopy (... phase elements, i.e., copper, and growth of the barrier **aluminum oxide** layer on the surface. These two ... were found to enhance the corrosion resistance properties of the **aluminum** alloy surface. Additionally, various organically-modified ... provide good corrosion resistance characteristics for 2024-T3 **aluminum** alloys as determined using potentiodynamic polarization ...

Melt Drawing/Coating of Oxide Fibers for Composite Materials Applications Mar 21, 1996 43 pages

Authors: J. K. Weber; J. J. Felten; P. C. Nordine; W. M. Kriven; CONTAINERLESS RESEARCH INC EVANSTON IL

Full Text Undercooled **oxide** melts achieved a melt viscosity sufficient to draw mullite fibers whose chemical, microstructural, and mechanical properties were measured. Tensile strengths were 5.61 +/- 0.71 GPa (810 +/- 100 KSI) ... . Somewhat larger values of tau d were obtained for LaPO4 coated fibers which provide an interface-weakening effect. Mullite fibers with YPO4 coatings exhibited chemical and dimensional stability during a 2 hour anneal in an **aluminum oxide** matrix at 1500 deg C. The fiber-pulling process has potential for scale-up to produce high quality **oxide** fibers at less than $100 per pound.

Melt Drawing/Coating of Oxide Fibers for Composite Materials Applications Mar 21, 1996 43 pages

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Environmentally Compliant Corrosion Resistant, & Electrically Conductive Inorganic Coatings for Aluminum Alloys Aug 31, 2001 352 pages

Authors: S. R. Taylor; R. B. Leggat; E. Pehovaz; R. G. Buchheit; W. Zhang; VIRGINIA UNIV CHARLOTTESVILLE OFFICE OF SPONSORED PROGRAMS

Full Text ... an environmentally compliant conversion coating for use on aerospace **aluminum** alloys (e.g., AA2024- T3). This conversion coating was to ... chromate conversion coatings. HT coatings are formed by exposure of **aluminum** and its alloys to alkaline lithium salt solutions. ... min. HT conversion coatings could also be post-treated (e.g., hydrothermally aged, surfactant) to revert the hydrotalcite to **aluminum oxide**, or augmented to include high valence-state rare earth ... cerium). Hydrothermal aging allowed a procedure to chemically anodize **aluminum**, while incorporation of cerium into the molecular gallery of ...

Characterization of Nanometer- to Micron-Sized Aluminum Powders by Thermogravimetric Analysis Jul 24, 2000 29 pages

Authors: Curtis E. Johnson; Stephen Fallis; Thomas J. Groshens; Kelvin T. Higa; Ismail M. Ismail; NAVAL AIR WARFARE CENTER WEAPONS DIV CHINA LAKE CA

Full Text ... of **aluminum** powders was studied by thermogravimetric analysis in air, oxygen, and nitrogen. Weight gains from complete oxidation of the **aluminum** were used to calculate particle sizes in the range of 30 nm to 500 nm. These particle sizes ... , and compared to crystallite size determined by x-ray diffraction. Weight gains from complete oxidation were also used to determine the amount of active metal and **aluminum oxide** present in the submicron powders. Nitridation of **aluminum** powders was studied for extended times at 600 deg C. A 2 micrometer powder was nearly completely nitrided in 1 h, indicating ...

New Approaches to Aluminum Passivation for Corrosion Prevention Aug 31, 1998 29 pages

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

Full Text A new method for producing an **aluminum oxide** film on an **aluminum** surface has been discovered. This method involves the activation of adsorbed H2O molecules by the attachment of low energy electrons-producing OH radicals which are aggressive oxidizing agents. Al2 O3 film ... , and the artificially produced films exhibit a factor of 15-20 x higher impedance than thermally-grown Al2O3 films of the same thickness. In addition the stability of two **aluminum** corrosion inhibitor molecules on Al2O3 has been separately investigated using FTIR spectroscopy.

Scanning Photoacoustic Microscopy of Aluminum with Aluminum Oxide, Roughness Standards, and Rubber Jul 10, 1985 67 pages

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

Full Text ... mm, and the technique is particularly sensitive to flaws at depths from about 1 micron to 300 microns. The probe depth can be controlled experimentally. SPAM is also well suited to automatic data acquisition. Some applications of SPAM and related thermal wave techniques to the studies of: **aluminum** with dispersed Al2O3 particles; surface roughness standards; and rubber track shoe pad material have been described. Similar applications for thermal wave images for color encoding at TACOM; coated samples; surface geometry; and dispersion in rubber samples have been described. In this final report, ...

Grit-Blast/Silane (GBS) Aluminum Surface Preparation for Structural Adhesive Bonding Apr 30, 2003 69 pages

Authors: James J. Mazza; Jason B. Avram; Ronald J. Kuhbander; DAYTON UNIV OH RESEARCH INST

Full Text

A silane surface preparation for on-aircraft adhesive bonding of **aluminum**, known as the grit-blast/silane (GBS) process, has been optimized. It consists of abrasion using 3M Company Scotch-Brite(R) pads, **aluminum oxide** grit blast, and application of an epoxy-functional organosilane coupling agent hydrolyzed in water. The surface preparation has advantages for on-aircraft repair since it does not require the use of acids.

Heterogeneous Chemistry on Metal Oxide Surfaces of Interest for the Stratospheric Effects of Solid Rocket Motor Exhaust Dec 1995 12 pages

Authors: D. D. Spencer; R. Meads; L. T. Molina; M. J. Molina; MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF EARTH ATMOSPHERIC AND PLANETARYSCIENCES

Full Text

The emissions from solid rocket motors (SRMs) include hydrogen chloride vapor (HCl) and other inorganic chlorine compounds, as well as **aluminum oxide** particles. The effects of these emissions on stratospheric ozone have been investigated by Prather et al. 1, Pyle2, and others. Even though such effects are not evident from satellite observations following a Space Shuttle launch 3, it is possible for the perturbation to be quite pronounced in the immediate neighborhood of the rocket plume.

Stoichiometry and Characterization of Aluminum Oxynitride Thin Films by Ion-Beam-Assisted Pulsed Laser Deposition (Preprint) Jan 2007 23 pages

Authors: J. S. Zabinski; J. J. Hu; J. E. Bultman; N. A. Pierce; A. A. Voevodin; DAYTON UNIV OH RESEARCH INST

Full Text

Oxides are inherently stable in air at elevated temperatures and may serve as wear resistant matrices for solid lubricants. **Aluminum oxide** is a particularly good candidate for a matrix because it has good diffusion barrier properties and modest hardness. Most thin film deposition techniques that are used to grow alumina require high temperatures to impart crystallinity. Crystalline films are about twice as hard as amorphous ones. Unfortunately, the mechanical properties of most engineering steels are degraded at ...

Thermal Control Coatings for High Thermal Conductivity (K) Substrates Jan 1999 286 pages

Authors: C. K. Reed; J. M. Wright; LOCKHEED MARTIN VOUGHT SYSTEMS CORP DALLAS TX

Full Text

... and application of plasma sprayed thermal control **oxide** coatings onto high thermal conductivity substrates for spacecraft use. Ultrahigh purity **oxide** powders were successfully reproduced and ... , and 6061. The application of the ultrahigh purity **oxide** powders was optimized for minimum solar absorptance and ... 0.19 were obtained by using blended **oxide** powders from multiple vendors. End of life ... value of 0.10 was obtained for the ultrahigh purity **aluminum oxide**. End of life solar absorptance ... Normal emittance values for the ultrahigh purity **aluminum oxide** was 0. 833 and 0.829 for the blended ...

Characterization of Tissue Ingrowth Into Porous Bioceramics May 1, 1972 137 pages

Authors: Samuel F. Hulbert; Jerome J. Klawitter; Barry W. Sauer; Joel R. Matthews; CLEMSON UNIV SC DIV OF INTERDISCIPLINARY STUDIES

Full Text

A study of the tissue compatibility of the **aluminum oxide** implant material under different stress conditions in rabbits was performed over 4- and ... to examine endosteal bone ingrowth into **aluminum oxide** cone-shaped stump plugs in amputated tibiae ... bone activity, (b) the degree of inertness and/or toxicity of the **aluminum oxide** implants, and (c) a possible cause of ... little mineralized bone ingrowth into the cone-shaped **aluminum oxide** implants in the amputated tibiae. The study also showed that the **aluminum oxide** pellet implants in the tibiae and femur of the non-amputated limbs demonstrated ...

Pressureless Infiltration of Ceramics by Molten Metals Dec 1995 105 pages

Authors: P. R. Chidambaram; G. R. Edwards; COLORADO SCHOOL OF MINES GOLDEN CENTER FOR WELDING AND JOINING RESEARCH

Full Text

... being investigated for their respective pressureless infiltration potential. A 'carrier **oxide**' approach to infiltration relies on the use of a intermediary liquid **oxide** which ... in copper-oxygen and copper-titanium alloy liquids in contact with alumina substrates. **Aluminum oxide**, a relatively cheap reinforcing material, does not develop an interface with liquid **aluminum**, but titanium readily wets **aluminum oxide**. Titanium-coated **aluminum oxide** surfaces are energetically conducive to the pressureless infiltration of liquid **aluminum**. Results from the above two approaches are discussed in detail in ...

Atomic Layer Deposition of Oxidizer Coatings on Aluminum, Nanoparticles to Fabricate Superthermite Explosives Nov 29, 2003 22 pages

Authors: Karen J. Buechler; Steven M. George; John Ferguson; ALD NANOSOLUTIONS INC WESTMINSTER CO

Full Text

... goals were to establish the conditions for deposition of tin **oxide**, coat a quantity of **aluminum** particles with tin **oxide** ... economic feasibility of the process. Chemistry to deposit tin **oxide** on zirconia particles by atomic layer deposition was ... established conditions to shift the chemistry to the desired **aluminum** particle substrate. Composite thermite particles ... reactive. However, deposition was not as efficient on the **aluminum** particles as the zirconia particles. The measured reactivity ... particles had an atomic ratio of oxygen to **aluminum** of 0.28 instead of the optimum 1.5. The reactivity falls ...

Simulations of Energetic Materials for Rocket Propulsion: Obtaining More "Bang for the Buck" Apr 29, 2002 5 pages

Authors: Dan C. Sorescu; Donald L. Thompson; Jerry Boatz; AIR FORCE RESEARCH LAB EDWARDS AFB CA

PROPULSION DIRECTORATE WEST

Full Text

... of some conventional ammonium perchlorate solid propellant formulations. However, the performance of **aluminum** is reduced by the rapid formation of an **aluminum oxide** overcoat on **aluminum** particles prior to combustion, which also inhibits efficient burning. Furthermore, formation of the **oxide** overcoat severely reduces the potential advantages of using high surface-to-volume-ratio ultrafine **aluminum** particles, which would otherwise have highly desirable ... simultaneously degrading performance, it has been proposed to coat the **aluminum** particles with an energetic material such as HMX.

Effect of Orientation on Friction Characteristics of Single-Crystal Beryllium in Vacuum (10(exp -10) Torr) Jul 1966 21 pages

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

Full Text

... of single-crystal beryllium on its friction characteristics when in sliding contact with sapphire and polycrystalline beryllium and **aluminum oxide**. Experiments were conducted in a vacuum of 10(exp - ... 3/16-inch hemispherical-radius beryllium crystal sliding on a flat of beryllium and **aluminum oxide**. The rider was loaded against the flat with various loads from ... coefficient of single-crystal beryllium sliding on sapphire was lower than that of single- crystal beryllium sliding on polycrystalline **aluminum oxide**. With sapphire, brittle fracture of sapphire was observed, while ...

XPS Analysis of A1/EPDM Bondlines from IUS SRM-1 Polar Bosses Mar 10, 1993 25 pages

Authors: Carol S. Hemminger; Nicholas Marquez; AEROSPACE CORP EL SEGUNDO CA TECHNOLOGY OPERATIONS

Full Text

... partial immersion in liquid nitrogen has been developed for the **aluminum**/EPDM rubber insulation bondline of the IUS SRM-1 polar bosses in ... presence of corrosion over the entire mid- section of the ruptured **aluminum** to insulation bondline. The predominant corrosion product detected was **aluminum oxide**/hydroxide. The corroded bondline sections had significantly higher concentrations of **aluminum oxide**/hydroxide than the noncorroded areas, and lower concentrations of ... appeared to progress most readily through areas of thickened **aluminum oxide**/hydroxide infiltrated into the primer layer. In general ...

Crested Tunnel Barriers for Fast Scalable Nonvolatile Memories Mar 2004 8 pages

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

Full Text

... barriers based on a combination of plasma-grown A1203 layers with either thermally-grown **aluminum oxide** or silicon dioxide (see Fig. 7 and its discussion above). ... will be explored. One possible way is to deposit a thin (-2-nm) **aluminum** layer on the thermally-grown **oxide**, and plasma-oxidize it thoroughly. If this way will not give a sufficiently smooth **aluminum** film (e.g., because of poor wetting), other methods of the second layer ... barrier homogeneity and reproducibility. 4) Chemical and physical structure of various **aluminum oxide** layers and their interfaces will be understood in more detail ...

Use of Surface Replication Extraction Replication and Thin-Film Electron Microscopy in the Study of Dispersion-Strengthened Materials Mar 1968 26 pages

Authors: Charles A. Hoffman; Bruno C. Buzek; NATIONAL AERONAUTICS AND SPACE ADMINISTRATION CLEVELAND OH LEWIS RESEARCH CENTER

Full Text

... gave the best agreement of measured and nominal amounts of **oxide** whether the **oxide** was discrete and spheroidal (i. e., nickel + thorium, dioxide (Ni + ThO2)) or plate-like and aggregated (i. e., **aluminum** + **aluminum oxide** (Al + Al2O3)); this method was also felt to give the most ... for the latter; the validity of the extraction method was dependent on the shape of the **oxide** particles and its state of aggregation as well as the ... the finer particles but gave considerably greater volume fractions of **oxide** particles compared to the respective nominal amounts: For the Ni + ...

The Surface Preparation of Aluminum Alloys Using the Phosphoric Acid Containment System for Repair Sep 1994 54 pages

Authors: Susan S. Saliba; DAYTON UNIV OH RESEARCH INST

Full Text

... to provide on-aircraft phosphoric acid anodization of **aluminum** surfaces. The first objective of this investigation was to determine if ... of various operating parameters on the quality of the prepared **aluminum** surface. The operating, or processing, variables examined included ... anodization time/acid flow rate over the **aluminum**, orientation of the surface being anodized, temperature of ... preparation and the adhesive. In addition, the surface morphology of the **aluminum** surface was characterized. Wedge test results indicated ... PACS and PAA surfaces were similar in overall **oxide** layer structure, but differed ...

DEPOSITION OF REFRACTORY COATINGS WITH THE USE OF PLASMA May 13, 1969 14 pages

Authors: T. A. Nimvitskaya; S. L. Fishman; FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSONAFB OH

Full Text

... properties of deposited refractory coatings were examined. The coating of low and medium carbon steel with **aluminum oxide** (30-70 micron) or **aluminum oxide** containing oxygen-resistant enamel or base enamel was carried out using a plasma apparatus and argon, nitrogen, helium, ... 70C with washing and neutralizing, chemical nickel or cobalt plating, or conventional coating with base enamel. Plasma deposition of the **aluminum oxide** onto the nickel - or cobalt-plated metal resulted in poor adherence to the metal. Deposition onto the enamel-primed material gave coatings ...

Laboratory Studies of Al(2)O(3)-NO(x) Aerosols Sep 30, 1999 13 pages

Authors: Robert Disselkamp; John R. Edwards; Daniel Pilson; Tyrrel W. Smith Jr.; TRW SPACE AND ELECTRONICS GROUP REDONDOBEACH CA

Laboratory experiments were performed to investigate the chemistry of **aluminum oxide** (gamma Al(2)0(3)) aerosol samples upon exposure to NO(x) (NO ... spectra were collected over a 20-minute time interval to

Full Text

characterize heterogeneous reactions occurring on the chamber walls. Next, an **aluminum oxide** aerosol was generated by expanding powder into the chamber using nitrogen gas at high pressure. Infrared spectra were then ... gas depletion and product gas formation enabled elementary reactions involving **aluminum oxide** surface hydroxyl sites and NO(x) species to be proposed. (2 tables, 2 figures, 6 refs.)

Marine Corrosion Studies: The Effects of Dissimilar Metal Couples and Toxicants from Antifouling Paints on the Corrosion of 5086 and 6061 Aluminum Alloys and Their Response to Cathodic Protection. May 1972 86 pages

Authors: T. J. Lennox Jr.; M. H. Peterson; J. A. Smith; R. E. Groover; NAVAL RESEARCH LAB WASHINGTON D C

Full Text

... galvanic corrosion could not be completely prevented by cathodic protection. A magnesium anode also caused severe corrosion of the **aluminum** in seawater. **Aluminum** alloy 6061-T6 was severely corroded when continuously immersed in quiescent seawater or in the Potomac River. In seawater corrosion caused by the cuprous **oxide** toxicant was not as severe as that observed on uncoated and unprotected 6061-T6 **aluminum**, but in the Potomac River the depth of corrosion was significantly increased by the cuprous **oxide** antifouling coating. (Author)

Chemistry, Structure and Morphology of Native and Passive Oxide Films on Aluminum Rich Amorphous Al-Fe-Ce Alloys Jun 23, 1994 18 pages

Authors: A. N. Mansour; C. A. Melendres; NAVAL SURFACE WARFARE CENTER SILVER SPRING MD

Full Text

Aluminum based metallic glasses are of technological importance due to their high strength, low density, and anticipated high resistance to corrosion. We report on the corrosion characteristics such as ... Al(90)Fe(10-x)Ce (x) (x = 3,5,7). In addition, we have examined the chemistry, structure, and morphology of the native and passive **oxide** films using X-ray Absorption Fine Structure Spectroscopy, X-ray Photoelectron Spectroscopy and Scanning Electron Microscopy. Passive **oxide** films were induced by anodizing below the pitting potential in an aqueous solution of 0.9 wt% NaCl for 30 and 60 minutes ...

Sodium Gallium Oxide Electrolyte Additive for Aluminum Anode Activation Nov 30, 2001 13 pages

Authors: Louis G. Carreiro; Steven P. Tucker; DEPARTMENT OF THE NAVY WASHINGTON DC

Full Text

An additive for an aluminum-based semi-fuel cell system includes a combination of components including gallium, oxygen, and a sodium component dissolvable an alkaline electrolyte solution such as seawater and sodium hydroxide. These components form sodium gallium **oxide** and prevent or reduce formation of an **oxide** layer on a surface of an **aluminum** anode in the alkaline electrolyte of the semi-fuel cell system.

The Phytotoxicity of Designated Pollutants on Plant Species Mar 1984 85 pages

Authors: A. L. Granett; CALIFORNIA UNIV IRVINE

Full Text

... lifts off. The phytotoxicity of products released from thic cloud was studied. **Aluminum oxide** dust and droplets of hydrogen chloride (HCl) were found on leaves of plants at the Kennedy Space Center following launch. The nontoxic nature of **aluminum oxide** was confirmed in laboratory tests. Acidity of the mist was more important than the length of exposure. Leaves were the most likely ... actual numbers of plants exposed would depend on climatic conditions. Detecting foliar **aluminum** deposits may provide evidence that the ground cloud passed over certain vegetation. ...

Growth and Breakdown of Surface Films and Localized Corrosion of Aluminum in Concentrated Chloride Media Jun 1994 14 pages

Authors: Jiajing Lee; Ajit K. Mal; Ken Nobe; CALIFORNIA UNIV LOS ANGELES DEPT OF MECHANICAL AEROSPACE AND NUCLEAR ENGINEERING

Full Text

Oxide films and salt films form on metal surfaces during anodic dissolution. In high chloride concentration environments the **oxide** films break down and salt films form. Our overall goal is to ascertain the relationships between pitting and crack initiation, the formation and breakdown of salt films (including oxides) and mechanical stress for **aluminum** and titanium alloys in aggressive corrosion environments. This report presents results of some very preliminary experiments on **aluminum** alloys and titanium during anodic dissolution in chloride media. With more extensive studies, we seek to ...

A Ceramic Armor Material Database Jan 1999 240 pages

Authors: T. J. Holmquist; A. M. Rajendran; D. W. Templeton; K. D. Bishnoi; TACOM RESEARCH DEVELOPMENT AND ENGINEERING CENTER WARREN MI

Full Text

... disciplines, covering over thirty years are documented in this report. The data include nine different ceramic materials. The ceramics are Silicon Carbide, Boron Carbide, Titanium Diboride, **Aluminum** Nitride, Silicon Nitride, **Aluminum Oxide** (85% pure), **Aluminum Oxide** (high purity), Tungsten Carbide and Glass. For each ceramic material, experimental data are tabulated for the following experiment types; (1) mechanical tests, (2) hydrostatic tests, (3) plate impact tests, ...

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 ... , 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 given, ... resistance, 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.

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, ... + 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 of ...

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. ... 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 technical ... 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, ... 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 ...

Total Results: **197** Pages: Previous **[1]** 2 3 4 Next Results per page: 50

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