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Aluminum oxide

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[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 ...

[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](#)

Full Text

Analytical and numerical studies on n-octane and **aluminum** metal slurry droplet combustion and metal slurry ... spray combustion calculations. An analytical model describes the combustion of **aluminum** particles in air. The particle transient heating, the ... 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 times ... 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: [Lorraine 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 Infocscitex. **Aluminum** and titanium alloys are used as replacements for steel in gear boxes of ... metals. Infocscitex 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 ... 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](#)

... 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.

[Full Text](#)

[Investigation of the Effects of Solid Rocket Motor Propellant Composition on Plume](#)

Jun 16, 1994 65 pages

[Signature](#)

Authors: [Clay J. Snaza](#); [NAVAL POSTGRADUATE SCHOOL MONTEREY CA](#)

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 plume ... 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 SiO₂ ... 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

[Full Text](#)

[The Effect of Solid Propellant Binder on the Formation and Evolution of Aluminum](#)

Jun 1996 84 pages

[Combustion Products](#)

Authors: [V. E. Zarko](#); [O. G. Glotov](#); [V. V. Karasev](#); [M. V. Beckstead](#); [BRIGHAM YOUNG UNIV PROVO UT](#)

... 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 ... show 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 (...

[Full Text](#)

[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](#)

... 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 ... 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 interesting ...

[Full Text](#)

[Structure and Properties of Aluminum Nitride and AION Ceramics](#)

May 2002 30 pages

Authors: [James W. McCauley](#); [ARMY RESEARCH LAB ABERDEEN PROVING GROUND MD WEAPONS AND MATERIALS RESEARCH DIRECTORATE](#)

A brief review of **aluminum** nitride and AION ceramics is presented in the context of the pseudobinary **aluminum** nitride-aluminum **oxide** phase equilibrium system. AION 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 oxyntitride spinel model and the various phases, including polytypoids, in this system. Then, a brief summary is given on the processing and ...

[Full Text](#)

[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](#)

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.

[Full Text](#)

[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](#)

... 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 ...

[Full Text](#)

[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 μm in diameter with lengths ranging from 0.3 μm to 3 μm 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 YBa₂Cu₃O_{6+x} by Addition of Al₂O₃](#)

1992 20 pages

[Particles](#)

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 Ba₆Y₂Al₄O₁₅ 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** (Ba₆Y₂Al₄O₁₅)

[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 by ... 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 thiophene) (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 arrays ... 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 and ...

[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 thermogravimetric 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 TFTs 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 TFTs with critical dimensions as small as 25 ?m. Lithography patterning of ...

[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 ... 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 that ...

[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 ...

[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

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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

[Alloys](#)

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 Characterize Ceramics for Personnel Protection](#)

Apr 2000 43 pages

Authors: [Thomas J. Moynihan](#); [Shun-Chin Chou](#); [Audrey L. Mihalcin](#); [ARMY RESEARCH LAB ABERDEEN PROVING GROUND MD](#)

[Full Text](#)

... 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 correlated ...

[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 ... 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 T-burner ...

[Oxidation Processes on Aluminum and Rhodium](#)

Mar 17, 2004 9 pages

Authors: [Andrew M. Rappe](#); [PENNSYLVANIA UNIV PHILADELPHIA DEPT OF CHEMISTRY](#)

[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).

ELECTROCHEMICAL BEHAVIOUR OF OXYGEN AND HYDROGEN PEROXIDE ON ALUMINUM, TANTALUM AND ZIRCONIUM ELECTRODES Dec 1960 25 pages

Authors: [G. Bianchi](#); [G. Caprioglio](#); [MILAN UNIV \(ITALY\)](#)

Full Text

The cathodic reduction of O and H₂O₂ on Al, Ta, and Zr was studied by means of a polarization cell and an electronic potentiostat. Al, Ta and Zr, although covered by an **oxide** layer, acted AS CATHODE FOR THE PROCESSES OF O and H₂O₂ reduction. Overvoltage values and the polarization curves are listed. The results obtained on these 3 metals are compared with those previously obtained on Ti. Overvoltages for cathodic reduction of O decrease in the following order: Zr, Ta, Ti for acid; Al, Ta, Zr, Ti for neutral; and Zr, Ti, Ta for alkaline solutions. These results indicate that the dangers of ...

EXPERIMENTAL INVESTIGATION OF COMPACT CHARGE IONIZATION Mar 1, 1960 165 pages

Authors: [E. N. Petrick](#); [O. K. Husmann](#); [H. W. Szymanowski](#); [CURTISS-WRIGHT CORP QUEHANNA PA](#)

Full Text

... tests to establish the materials least subject to attack by cesium, including emitter materials (tungsten, molybdenum, platinum), structural materials (nickel, stainless steel), electrical conductors (copper), and electrical insulators (**aluminum oxide**); (7) investigation of emitter heating techniques, with tests of an inductive technique (no internal connections) and of a direct heating technique; and (8) elimination of fuel handling problems.

SYNTHESIS AND PYROLYSIS OF METAL ALKOXIDES AS POTENTIAL REFRACTORY OXIDE COATINGS FOR GRAPHITE. May 1963 40 pages

Authors: [K.S. Mazdiyasi](#); [C.T. Lynch](#); [DIRECTORATE OF MATERIALS AND EXPLOSIVES RESEARCH AND DEVELOPMENT \(GT BRIT\)](#)

Full Text

... of hafnia and zirconia on graphite substrates by decomposition of the isopropyl and tertiary butyl alkoxides was investigated. The infrared spectra of the isopropoxide-zirconium and hafnium were obtained. Thorium isopropoxide infrared data were also obtained and the spectra compared with titanium and **aluminum** isopropoxides. The tertiary but oxides show more promise for coating applications because of their higher vapor pressures. The vapor pressures and decomposition temperatures of the zirconium and hafnium butoxides were studied. Preliminary data on the oxidation resistance to 1000 C of ...

INTERACTION OF PROJECTILES AND COMPOSITE ARMOR Jan 31, 1967 135 pages

Authors: [A. L. Florence](#); [T. J. Ahrens](#); [STANFORD RESEARCH INST MENLO PARK CA](#)

Full Text

... stress fields in the facing plate during the initial stages of impact and to determine deflections and bending moments during the later stages. In addition to this work on the mechanics of projectile-armor interaction, exploratory experiments were undertaken with a view toward establishing the dynamic mechanical properties of **aluminum oxide**, an important facing material.

DEVELOPMENT AND EVALUATION OF TRANSPARENT ALUMINUM OXIDE Jun 30, 1967 73 pages

Authors: [William H. Rhodes](#); [DAVID J. SELLERS](#); [Arthur H. Heuer](#); [Thomas Vasilos](#); [AVCO MISSILES SPACE AND ELECTRONICS GROUP LOWELL MA AVCO SPACE SYSTEMS DIV](#)

Full Text

Polycrystalline alumina (Al₂O₃) possessing high total and in-line transmission in the visible range was prepared successfully by a combined high temperature hot forging and annealing operation. Transparency was found to be produced by a combination of several pore removal mechanisms active during deformation and primary recrystallization. A strong basal texture normal to the pressing direction was found for both deformation and recrystallization structures, and the high in-line transmission characteristics were thought to be due to a lowering of birefringent scattering because of this texture ...

Electrophoresis of Colloidal Biological Particles Aug 1969 57 pages

Authors: [John F. Lemp Jr.](#); [Eugene D. Asbury](#); [Edward O. Ridenour](#); [FORT DETRICK FREDERICK MD](#)

Full Text

... kind of biological particles is uniform in a constant environment. The microscope electrophoresis techniques for mobility and isoelectric point determinations of microscopic particles (bacteria, suspended mammalian tissue cells, **aluminum oxide** particles, and polystyrene latex particles) and submicroscopic particles (proteins and gelatin) are described. The information that can be obtained and the additives for modification of electrophoretic mobility ...

Studies of the Exhaust Products from Solid Propellant Rocket Motors Sep 1976 115 pages

Authors: [R. Dawbarn](#); [M. Kinslow](#); [ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AFS TN](#)

Full Text

... to determine the feasibility of conducting environmental chamber tests on the physical processes which occur when a solid rocket motor exhaust mixes with the ambient atmosphere. Of particular interest was the interaction between hydrogen chloride, **aluminum oxide**, and water vapor. The program consisted of three phases: (1) building a small rocket motor and using it to provide the exhaust species in a controlled environment; (2)

evaluating instruments used to detect and ...

[Determination of Effects of Designated Pollutants on Plant Species](#)

Oct 1976 57 pages

Authors: [A. L. Granett](#); [O. C. Taylor](#); CALIFORNIA UNIV RIVERSIDE AIR POLLUTION RESEARCH CENTER

... Vandenberg Air Force Base and were grown in greenhouses equipped with evaporative coolers with activated charcoal air filters. The missile products investigated were hydrogen chloride and hydrogen fluoride gases and **aluminum oxide** aerosols, alone and in various combinations of toxicants. The gases were generated by the volatilization of acid liquids into a hot air stream and the aerosols were generated using nitrogen gas to carry the particles ...

[Full Text](#)

[The Effects of Designated Pollutants on Plants](#)

Nov 1978 74 pages

Authors: [A. L. Granett](#); [O. C. Taylor](#); CALIFORNIA UNIV IRVINE

The phytotoxicity of hydrogen chloride (HC1) gas and **aluminum oxide** (Al₂O₃) particulates was studied in special plant exposure chambers. These pollutants were generated separately by diluting bottled gas or commercial alumina dust. In addition, generation was affected by open-burning of small pieces of solid rocket fuel. The characteristics of these burn products were investigated. Rocket fuel gases produced phytotoxic responses similar to that seen on plants exposed to commercial HCl gas.

[Full Text](#)

[Lubrication with Naturally Occurring Double Oxide Films](#)

Nov 10, 1982 60 pages

Authors: [M. B. Petterson](#); [S. J. Calabrese](#); [B. Stupp](#); WEAR SCIENCES INC ARNOLD MD

A study was conducted to evaluate the lubrication characteristics of double oxides which could occur naturally on high temperature bearing materials. Consideration was given to the double oxides of iron, nickel, cobalt, rhenium, osmium, molybdenum, tungsten, vanadium, chromium, copper, titanium, **aluminum**, boron, and niobium. A survey was conducted to obtain property data on such compounds and a number selected for evaluation. Primary consideration was given to the rhenates, molybdates, vanadates, borates, osmoniates, and chromates. Friction tests were run over the temperature range 26 to 650C ...

[Full Text](#)

[STS-5 \(Space Transport System-5\) Fish Kill, Kennedy Space Center, Florida](#)

Jan 1983 28 pages

Authors: [Joseph E. Milligan](#); [Gene B. Hubbard](#); AIR FORCE OCCUPATIONAL AND ENVIRONMENTAL HEALTH LAB BROOKS AFB TX

... on-site investigation of any possible fish kill associated with STS-5 on 11 November 1982. Due to the acuteness of the fish kills and close association with time of launch, STS exhaust products, such as HC1 and/or **aluminum oxide** were suspected as the cause. Other potential causes considered included diseases, parasites, mechanical interference with respiration, insufficient oxygen, trauma, temperature and pH changes, and exposure to other toxic substances. The conclusion was ...

[Full Text](#)

[Environmental Effects in Niobium Base Alloys and Other Selected Intermetallic Compounds](#)

Dec 15, 1988 68 pages

Authors: [G. H. Meier](#); [A. W. Thompson](#); PITTSBURGH UNIV PA DEPT OF MATERIALS SCIENCE AND ENGINEERING

... alloys and other selected intermetallic compounds. This program consists of two parts. The investigations involving oxygen are directed toward describing the conditions which must be achieved in order to have a continuous, protective **Aluminum Oxide** or Silicon dioxide scale developed on niobium-base alloys and compounds, and other selected intermetallics, at temperatures between 600 and 1400 C. The studies concerned with hydrogen effects are directed toward ...

[Full Text](#)

[Computer Simulations of Epoxy Adhesive Monomer Interactions with Alumina Surfaces](#)

Aug 1992 26 pages

Authors: [Michael S. Sennett](#); [Walter X. Zukas](#); [Stanley E. Wentworth](#); ARMY LAB COMMAND WATERTOWN MA MATERIAL TECHNOLOGY LAB

An ongoing program in our laboratory seeks to elucidate the effect of **aluminum oxide** on the cure chemistry of epoxy adhesives. The project includes the use of molecular dynamics (MD) techniques to carry out real time simulations of the interaction of various epoxy adhesive monomers with idealized alumina surfaces. Adhesive monomers investigated include the diglycidyl ether of bisphenol A (DGEBA), a brominated form of DGEBA, diaminodiphenyl sulfone (DDS) and methylene dianiline (MDA). Both crystalline and amorphous ...

[Full Text](#)

[Emissivity of Rocket Plume Particulates](#)

Sep 1992 44 pages

Authors: [Curtis D. Whisman](#); NAVAL POSTGRADUATE SCHOOL MONTEREY CA

The optical properties of motor **aluminum oxide** are required inputs to current plume signature prediction codes, such as SIRRM. Accurate predictions are possible only if variations in the particle emissivity due to changes in particle size, contamination, and changing temperature, etc. are known. This investigation demonstrated a simplified method for determination of the emissivity of Rocket motor generated alumina. Plume particulate material was collected on tungsten alloy wire during motor firings. A DC circuit was used to resistively heat the ...

[Full Text](#)

[Fiber Coating by Sputtering for High Temperature Composites](#)

Oct 15, 1992 79 pages

Authors: [M. L. Emiliani](#); PRATT AND WHITNEY WEST PALM BEACH FL GOVERNMENT ENGINES AND SPACE PROPULSION

... examined as-sputtered Y2O3 coatings deposited onto various substrates to understand why this coating improves the toughness of Nb-reinforced TiAl. The option program study characterized tungsten and molybdenum coatings applied by hollow cathode magnetron sputtering, and **aluminum oxide** coatings applied by sol-gel processing. Sputtering, Coating, Debond, Composites fracture energy, Fracture toughness, Indentation.

[Full Text](#)

[Template Synthesis of Metal Microtubule Ensembles Utilizing Chemical, Electrochemical, and Vacuum Deposition Techniques](#)

Jan 3, 1994 37 pages

Authors: [Charles J. Brumlik](#); [Charles R. Martin](#); [Vinod P. Menon](#); [COLORADO STATE UNIV FORT COLLINS DEPT OF CHEMISTRY](#)

[Full Text](#)

... microtubules. Four procedures for preparing metal microtubules are described in this paper. The general approach, called template-synthesis, entails using the pores in a microporous membrane as templates for forming the tubules. Microporous anodic **aluminum oxide** membranes and nuclear track-etch membranes are used as the template membranes. Gold and silver microtubules are made with outer diameters as small as 200 nm. These microstructures are characterized by scanning electron ...

[Effect of Surface Condition on Strength and Fatigue Behavior of Alumina Ceramic](#)

Nov 1993 90 pages

Authors: [NAVAL COMMAND CONTROL AND OCEAN SURVEILLANCE CENTER RDT AND E DIV SAN DIEGO CA](#)

[Full Text](#)

... in an effort to attain the appropriate strength and buoyancy characteristics, is investigating the suitability of ceramics. The vessels typically consist of cylindrical sections and hemispherical end caps of a ceramic such as **aluminum oxide** (alumina), which are joined together via metallic rings made of a titanium alloy Tests of such vessels have shown that fatigue cracks may arise in the alumina during submergence-emergence cycles, which ultimately ...

[Template Synthesized Nanoscopic Gold Particles: Optical Spectra and the Effects of Particle Size and Shape](#)

Jan 25, 1994 43 pages

Authors: [Colby A. Foss Jr.](#); [Gabor L. Hornyak](#); [Jon A. Stockert](#); [Charles R. Martin](#); [COLORADO STATE UNIV FORT COLLINS DEPT OF CHEMISTRY](#)

[Full Text](#)

We have prepared nanoscopic gold cylinders of controlled radius and aspect ratio via electrodeposition of the metal within the pores of anodically- grown porous **aluminum oxide** membranes. The nanocylinder radii are determined by the pore dimensions of the host alumina which, in turn, depend on anodization conditions. The particle aspect ratios were controlled by varying the amount of Au deposited within the pores The optical spectra of the gold nanocylinder/ alumina composites ...

[Validation and Implementation of Optical Diagnostics for Particle Sizing in Rocket Motors](#)

Dec 1993 45 pages

Authors: [Paul V. Gomes](#); [NAVAL POSTGRADUATE SCHOOL MONTEREY CA](#)

[Full Text](#)

Aluminum oxide(Al₂O₃) particles of known size distribution were cast into a solid propellant which burned at temperatures less than the melting point of Al₂O₃. Thus, particles of known size distribution existed at the nozzle inlet and in the plume. Malvern particle sizing instruments were used to make measurements at these two location using a windowed subscale motor and the results were compared to the known distribution. In the motor, measurements were limited due to disruptive flow from the window purge gas. However, the unaffected larger modes were properly measured. In the plume, ...

[Processing and Characterization of Mechanically Alloyed NiAl-Based Alloys](#)

Jul 20, 1994 85 pages

Authors: [Marek Dollar](#); [Philip Nash](#); [Stanislaw Dymek](#); [Seung- Joon Hwang](#); [Sung-Jae Suh](#); [ILLINOIS INST OF TECH CHICAGO DEPT OF METALLURGICAL AND MATERIALS ENGINEERING](#)

[Full Text](#)

... alloying of powders followed by hot extrusion has been used to produce NiAl-based materials. The technique is capable of producing fully dense, free of cracks, fine grained materials containing a bimodal distribution of **aluminum oxide** dispersoids. The mechanically alloyed materials produced in our laboratory are much stronger at both ambient and elevated temperatures and significantly more ductile than their cast counterparts. Minimum creep rates in the MA NiAl are ...

Total Results: 197

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