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A FORMING TECHNIQUE FOR SOLDIERS TITANIUM HELMETS Jul 1968 63 pages

Authors: Robert L Kane; Robert S Smith; TITANIUM METALS CORP OF AMERICA WEST CALDWELL NJ

Full Text The report discusses the use of both alloy and commercially pure **titanium** metal for fabrication of infantry helmets. The use of **titanium** metal allows a weight reduction without impairing the ballistic protection of the helmet.

DEVELOPMENT OF A STABLE BETA TITANIUM ALLOY. Dec 31, 1962 38 pages

Authors: D.B. Hunter; TITANIUM METALS CORP OF AMERICA TORONTO OHIO

Full Text Research has progressed toward the objective of developing stable-beta **titanium** sheet alloys capable of being precipitation hardened to high strengths. Screening criteria are rollability, and response to heat treatment. Additions of 12.5 and 15% Cr and Mn were made to the three base alloys, Ti-17V-3Al, Ti-8V-8Mo-3Al, and Ti-15Mo-3Al. All such alloys were found to have poor fabrication characteristics, and also low ductilities in both the solution treated and aged conditions. (Author)

Fracture Toughness and Processing Routes Relations in Commercial Titanium Alloys for Developing Alternative Alloys for Ti-6Al-4V Jul 31, 1997 20 pages

Authors: Mitsuo Niinomi; JAPAN TITANIUM SOCIETY TOKYO

Full Text The static and dynamic fracture toughness, strength, and ductility of various **titanium** alloys were investigated. The crack propagation toughness and fatigue crack propagation rate under both static and dynamic conditions were also investigated an compared with that of T-6Al-4V at the elevated temperatures. The results showed that sudden decrease in strength, fracture toughness values or the stress intensity factors were noticeable at the elevated temperature of 1123K. The fracture toughness values evaluated from the load values (stress intensity factors) also decreased at a single annealing ...

Development of a Stable-Beta Titanium Alloy. Dec 31, 1964 41 pages

Authors: D. B. Hunter; TITANIUM METALS CORP OF AMERICA NEW YORK

Full Text ... . In smooth and notched tensile tests at 600F, Ti-17V-7.5Co-3Al displayed more strength than Ti-8Mo-8V-5Co-3Al because of its faster aging response in a given time. However, in creep stability tests and oxidation tests, Ti-8Mo-8V-5Co-3Al was the better alloy. Stress corrosion tests performed upon all five ageable beta alloys developed in this project showed that, in the annealed condition, Ti-8Mo-8V-2Fe-3Al was the most resistant to stress corrosion and Ti-17V-7.5Co-3Al and Ti-8Mo-8V-5Co-3Al the most susceptible. Keywords: **Titanium** alloys; Vanadium; Cobalt; Aluminum; Molybdenum; Iron. (Author)

Titanium Nanosurface Modification by Anodization for Orthopedic Applications Jul 13, 2005 6 pages

Authors: Chang Yao; Elliott B. Slamovich; Thomas J. Webster; PURDUE UNIV LAFAYETTE IN

Full Text ... present in vitro study was to modify the surface of conventional **titanium** to include nanostructured surface features that promote ... cells are accustomed to interacting with. In this study, the surface of **titanium** was modified by anodic oxidation techniques. The electrolyte ... particulate or tube-like structures were formed on the **titanium** surface. X-ray diffraction results confirmed ... adhesion studies showed that the anodized nanostructured **titanium** surface promoted osteoblast adhesion compared ... may be a simple method to modify the surface of **titanium** implants to enhance bone-forming cell function ...

ACCELERATED CRACK PROPAGATION OF TITANIUM BY METHANOL, HALOGENATED HYDROCARBONS, AND OTHER SOLUTIONS Mar 6, 1967 70 pages

Authors: BATTELLE MEMORIAL INST COLUMBUS OH DEFENSE METALS INFORMATION CENTER

Full Text ... Ti-6Al-4V in methanol; Premature environmental stress cracking of **titanium** in methanol, freon, and other solutions; ... liquids, effect of inhibitors; The influence of fluorocarbon solvents on **titanium** alloys; Discussion of failure analysis and ... titanium-methanol stress corrosion problems; Subcritical cracking of **titanium** alloys and

high-strength steels in organic ... salt water and in carbon tetrachloride; Fracture behavior of **titanium** alloys in methanol environments; Mechanism ... failure; Investigation of stress-corrosion cracking of **titanium** alloys; Results of some Ti-6Al-4V - methanol experiments; ...

Influence of Crystal Structure on the Friction and Wear of Titanium and Titanium Alloys in Vacuum Mar 1965 17 pages

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

Full Text

... alloys sliding on themselves and on 440-C stainless steel. The **titanium** alloys included titanium-tin, titanium-oxygen, and ... The influence of tin and oxygen on the lattice parameters of **titanium** and its friction and wear characteristics ... and wear properties, the results of this investigation indicate that **titanium**, although a hexagonal metal, exhibits relatively high ... friction may be related to a difference in the slip mechanisms for **titanium**; **titanium** unlike most hexagonal metals slips ... rather than on the (0001) basal plane. The addition of tin or oxygen to **titanium** expands the crystal lattice of ...

THE STRESS-CORROSION AND ACCELERATED CRACK-PROPAGATION BEHAVIOR OF TITANIUM AND TITANIUM ALLOY. Feb 1, 1966 30 pages

Authors: J. D. Jackson; W. K. Boyd; BATTELLE MEMORIAL INST COLUMBUS OH DEFENSE METALS INFORMATION CENTER

Full Text

... stress-corrosion cracking and crack propagation behavior of **titanium** alloys in a variety of environments. Much of this information, ... additional information becomes available. Almost all **titanium** alloys are susceptible to stress-corrosion cracking at elevated temperatures ... three parameters vary significantly among the different **titanium** alloys. The mechanism of hot-salt stress-corrosion cracking ... silver compounds may cause stress-corrosion cracking of **titanium** alloys at 700 F and above. A type ... containing hydrochloric or sulfuric acids also crack **titanium** as does contact with liquid mercury and ...

TITANIUM AND HYDROGEN. Jan 13, 1965 18 pages

Authors: Yu. V. Baimakov; O. A. Lebedev; FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Full Text

... can be made. Maximum content of hydrogen in powder **titanium** is equal to 42.96 l/100 g, and ... of hydrogen is equal to 330C. Maximum saturation of **titanium** by hydrogen is observed in interval 300-500C. Speed ... by diffusion. During investigation of the kinetics of dissociation of **titanium**, decomposition of hydride starts at a temperature of 350-380C ... . On the basis of experiments of determination of elasticity of dissociation of **titanium** hydride in interval of temperatures 300-700C, it is shown ... the free energy of formation and dissociation of **titanium** hydride on the basis of the obtained data is equal ...

The Metallurgy of Titanium, Nov 27, 1970 757 pages

Authors: V. A. Garmata; B. S. Gulyanitskii; V. Yu. Kramnik; Ya. M. Lipkes; G. V. Seryakov; FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Full Text

The book analyses problems connected with the preparation of titanium-containing raw material for chlorination. The production of **titanium** tetrachloride, metallothermal methods of producing refining, and smelting **titanium** are examined. Methods of electrolytic production and refining **titanium**, the processing of **titanium** waste and **titanium** base alloys, and production of pigmentary **titanium** dioxide from **titanium** tetrachloride are described. Attention is paid to the properties of **titanium** and titanium-base alloys and the fields of their utilization. (Author)

Titanium Carbide-Graphite Composites Nov 8, 1991 75 pages

Authors: Delwyn Cummings; ADVANCED TECHNOLOGY MATERIALS INC DANBURY CT

Full Text

... carbide with free graphite, **titanium** carbide/vanadium carbide alloy with free graphite, and **titanium** carbide with boron and free graphite were tested for friction and wear at 22, ... ignots prepared from melts. The test pins were drawn across hot pressed **titanium** carbide wear plates with 5 newtons of normal force. The lowest friction coefficient at 22 C was 0.12 obtained with pure **titanium** carbide. The lowest friction coefficient at 900 C was 0.19 obtained with **titanium** carbide with boron and free graphite. **Titanium** carbide based materials offer a great deal of flexibility in terms of possible ...

Titanium '92: Science and Technology. Proceedings of a Symposium Sponsored by the Titanium Committee of the Minerals, Metals and Materials Structural Metals Division Held at the World Titanium Conference (7th) in San Diego, California on June 29-July 2, 1 1993 1037 pages

Authors: MINERALS METALS AND MATERIALS SOCIETY WARRENDALE PA

Full Text

Partial contents include the following: (1) **Titanium** process modelling; (2) Alloy theory and phase transformations ... **titanium** alloys; (3) Microstructure-property relationships in **titanium** alloys; (4) Fatigue and fracture toughness properties of Ti-6Al-4V ... mechanical properties of cast 5Al-2.5Sn ELI **titanium**; (6) Oxygen effects on the mechanical properties of Timetal-21S; ... microstructure in dynamic and static fracture of alpha-beta **titanium** alloys; (9) Void nucleation, void growth ... influence of silicon and silicides on the properties of near -alpha **titanium** alloys; and (11) The effect of deformation ...

Hydriding of Titanium Mar 1997 71 pages

Authors: Clyde L. Briant; K. S. Kumar; Zhengfu Wang; BROWN UNIV PROVIDENCE RI DIV OF ENGINEERING

Full Text

... goal of this project is to evaluate the performance of grade II **titanium** in sea water applications. The reason for undertaking ... work is that the US Navy would like to use **titanium** in a number of critical applications, where it would come ... water at elevated temperatures. Although the general reputation of **titanium** is that it is quite

corrosion resistant in these environments, ... has been conducted on the behavior of grade II **titanium** in sea water applications. The corrosion potential ... which determine the change in ductility of grade II **titanium** as a function of electrochemical potential, pH, strain ...

Full-Field Strain Behavior of Friction Stir-Welded Titanium Alloy Jan 1, 2008 236 pages

Authors: Trent A Greenwell; WASHINGTON UNIV SEATTLE

Full Text

... high heat tolerance, and exceptional corrosion resistance, **titanium** alloys are used extensively in a number of industries, such ... , aerospace. The aerospace industry is the single largest user of **titanium**, particularly Ti-6Al-4V which is considered the workhorse **titanium** ... join. This difficulty in joining poses particular problems for **titanium** alloy sheets, which are typically very limited in available sizes. Mechanical joining of **titanium** sheets requires strict vigilance to assure constant ... fasteners, which can be heavy and costly. **Titanium** is a highly reactive material making conventional fusion ...

Titanium Alloyed with Boron (Postprint) Apr 2006 5 pages

Authors: Seshacharyulu Tamirisakandala; Daniel B Miracle; Raghavan Srinivasan; Jay S Gunasekera; AIR FORCE RESEARCH LAB WRIGHT-PATTERSON AFB OH MATERIALS AND MANUFACTURING DIRECTORATE

Full Text

... , with make them desirable for a variety of critical applications. **Titanium** alloys are proved to be reliable materials for important aerospace applications ... , and the applications are expanding further in the next generation aircraft. The cost of **titanium** is still a major factor in the selection of **titanium**. ... to obtain controlled microstructures. Small additions of boron to conventional **titanium** alloys have been found to produce significant changes ... processing methodologies and to enhance performance over conventional **titanium** alloys. Ongoing efforts to develop affordable **titanium** technologies ...

Cost Increases Related to the Producer Price Index for Titanium Mill Shapes on DOD Multiyear Contracts Oct 29, 2009 41 pages

Authors: INSPECTOR GENERAL DEPT OF DEFENSE ARLINGTON VA

Full Text

DOD is subject to the volatility in the **titanium** market when pricing **titanium** materials in its contracts for DOD ... not have a strategic purchasing program for **titanium**. Long-term contracts with U.S. **titanium** producers could substantially ... unexpected price increases due to the market volatility of **titanium** pricing. Long-term contracts could also be beneficial to the U.S. **titanium** producers because the agreements provide a baseline volume, which is critical to establishing ... purchasing agreements with vendors, and planning manufacturing resources. The U.S. **titanium** producer investments to meet demand ...

Material - Brazing Alloys - Titanium Alloy Joining Wetability and Erosion Characteristics Dec 3, 1956 16 pages

Authors: L. D. Girton; H. C. Turner; W. M. Sutherland; GENERAL DYNAMICS CORP POMONA CA POMONA DIV

Full Text

... alloy to its flow point (1435 F) in contact with the various **titanium** alloys and in the presence of an inert atmosphere showed that lithium additions to the brazing alloy and nickled plating on the **titanium** alloys was not necessary to achieve good flows and wetability. This was attributed to the ability of **titanium** to absorb its own oxide at temperatures above 1300 F, a situation in which **titanium** alloys appear to possess a certain self-cleaning capability in the ... of inert atmosphere and moderate oxide coatings. The erosion of **titanium**, especially the 0.002 in. thick honeycomb core material was ...

Erosion-Resistant Coating for Titanium Jan 1973 87 pages

Authors: William J. McAnally III; PRATT AND WHITNEY AIRCRAFT WEST PALM BEACH FL FLORIDA RESEARCH AND DEVELOPMENT CENTER

Full Text

... CORROSION, PLATING, NICKEL, COMPRESSOR BLADES, IMPELLERS*ABRASION RESISTANT COATINGS, **TITANIUM** NITRIDES, **TITANIUM** CARBIDES, **TITANIUM** ALLOY 6AL 4V, **TITANIUM** BORIDEThe objective of the program was to ... the Ti-6Al-4V alloy with minimum degradation of mechanical properties. The approach for accomplishing this objective was to protect the **titanium** microstructure with an intermediate nickel barrier, as well as to provide a ductile layer which might ... . A brief evaluation of the fatigue characteristics and erosion resistance of nickel-plated and **titanium** diboride-coated **titanium** test specimens was made.

Development of Titanium Alloy Casting Technology. Aug 1976 311 pages

Authors: Don R. Schuyler; John A. Petrusha; G. S. Hall; S. R. Seagle; AIRESEARCH MFG CO OF ARIZONA PHOENIX

Full Text

... the technologies necessary to establish a low-cost approach for producing **titanium** investment castings. This approach was based on using simpler ... super-alloy investment foundries, for producing high-quality, low-cost **titanium** castings. Program objective included: (1) development of ... conducted, by RMI Company, evaluated eight binary **titanium** alloy systems. Low melting alloys from ... heat treatment response and melting temperature. A **titanium** modified yttria material (Y2O3.15Ti) ... developed for melting crucible applications. The concept of producing **titanium** castings using low-melting alloys, vacuum ...

An Evaluation of Titanium Exposed to Thermophilic and Marine Biofilms 1993 11 pages

Authors: Brenda J. Little; Patricia A. Wagner; Richard I. Ray; NAVAL RESEARCH LAB STENNIS SPACE CENTER MS

Full Text

... to thermophilic SRB. Hydrides did not form in **titanium** weld regions exposed to thermophilic hydrogen-producing bacteria. ... one year exposure to Pacific Ocean seawater, grade 2 **titanium** and SMO 254 were colonized by ... corr increased continuously for the stainless steel, but not for **titanium**. The latter result can be explained by the poor catalytic ... spectroscopy (EIS) remained constant for both metals with **titanium** showing values close to the theoretical value normally ... remained in the passive state throughout the entire period. **Titanium**, Microbiologically influenced corrosion, Extreme environment.

Hydriding of Titanium Mar 1998 63 pages

Authors: Clyde L. Briant; K. S. Kumar; Zhengfu Wang; BROWN UNIV PROVIDENCE RI DIV OF ENGINEERING

Full Text

... work is that the US Navy would like to use **titanium** in a number of critical applications, where it would come ... water at elevated temperatures. Although the general reputation of **titanium** is that it is corrosion resistant in these environments, there ... composition and heat treatment on the electrochemical properties of **titanium**; to determine the effect of these same variables ... conditions; to measure the rate of hydrogen diffusion in **titanium**; to propose a model to describe crack propagation ... that we have obtained show that grade 2 **titanium** is generally resistant to hydrogen embrittlement. However, ...

Ultrahigh Vacuum Metalorganic Chemical Vapor Deposition and In Situ Characterization of Nanoscale Titanium Dioxide Films May 1994 214 pages

Authors: Polly W. Chu; CORNELL UNIV ITHACA NY

Full Text

... method was developed for producing controlled submonolayer depositions from **titanium** isopropoxide precursor. Film thickness ranged ... were analyzed for evidence of interface reaction. Deposition from **titanium** isopropoxide is divided into two regimes: ... temperature was determined to be 300 deg C. Controlled submonolayers of **titanium** oxide were produced by cycles of dosing ... grown by the cycling method were determined to be TiO2. **Titanium** dioxide film stoichiometry was unaffected by isothermal ... shifts were consistent with oxygen in sapphire and **titanium** dioxide having different O is photoelectron peak ...

MATERIAL - BRAZING ALLOYS - TITANIUM ALLOY JOIN ING WETABILITY AND EROSION CHARACTERISTICS, Dec 3, 1956 11 pages

Authors: L.D. Girton; H.C. TURNER; W.M. SUTHERLAND; GENERAL DYNAMICS/POMONA CALIF

Full Text

... tests involving **titanium** honeycomb core joined to various **titanium** alloy face plates ranging 0.015 to 0.031 in. thickness with ... BT alloy to its flow point (1435 F) in contact with the various **titanium** alloys and in the pres ence of an inert atmosphere showed that lithium additions to the brazing alloy and nickeled plating on the **titanium** alloys was not necessary to achieve good flows and wetability. This was attributed to the ability of **titanium** to absorb its own oxide at temperatures above 1300 F, a situation in which **titanium** alloys appear to possess a certain self-cleaning capability in the ...

Durability of Adhesively Bonded Aluminum and Titanium Performance for Non-Chemical Surface Treatments Feb 1996 82 pages

Authors: Kristy L. Wolfe; Susan R. Harp; John G. Dillard; VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG DEPT OF CHEMISTRY

Full Text

... spraying inorganic and polymeric powders on aluminum and **titanium**. The plasma sprayed materials included Al2O3, ... on aluminum; TiO, TiSi2, MgO, and SiO2 on **titanium**; and polyester, epoxy, bismaleimide, and polyimide ... equivalent to that for phosphoric acid anodized aluminum. The performance for **titanium** samples prepared with a 25 micrometers thick TiO2, ... sprayed coatings was equivalent to that for a Turco 5578 prepared **titanium** surface. The systems exhibiting durability comparable to ... using the standard solution methods, included aluminum or **titanium** coated with bismaleimide/cyanate ester (BMI-CE) ...

Fundamental Studies: Inspection Properties for Engine Titanium Alloys Dec 2002 159 pages

Authors: F. J. Margetan; M. Gigliotti; L. Brashe; W. Leach; IOWA STATE UNIV AMES CENTER FOR NONDESTRUCTIVE EVALUATION

Full Text

... defects which can lead to failure. In light of this requirement, **titanium** components are typically inspected several times during ... . One of the methods used is ultrasonic inspection. However, **titanium** is an ultrasonically noisy material which can lead ... relationship between microstructure and detectability, the Engine **Titanium** Consortium completed an extensive study of the fundamental properties of **titanium** materials. This study focused on Ti -6Al -4V and Ti-17 (Ti-5 wt ... and samples to other technical tasks in the Engine **Titanium** Consortium. A summary of the findings is provided in this document.

(27)Al, (47,49)Ti, (31)P, and (13)C MAS NMR Study oF VX, GB, GD and HD Reactions With Nanosize Al2O3, Al2O3, TiO2, Aluminum And Titanium Jul 1, 2003 8 pages

Authors: George W Wagner; Lawrence R Procell; Shekar Munavalli; EDGEWOOD CHEMICAL BIOLOGICAL CENTER ABERDEEN PROVING GROUND MD

Full Text

... Al2O3, TiO2 (anatase and rutile), aluminum and **titanium** metal powders have been studied by 27Al, ... be environmentally-persistent. Similarly, GD hydrolysis on TiO2 yields **titanium** phosphonate species as detected by 31P MAS NMR. ... 47,49Ti NMR spectra of these species and those of **titanium** phosphonate model compounds were marginally successful. 47 ... NMR spectra were obtainable for anatase, rutile and **titanium** metal; thus severe quadrupolar linebroadening is suspected ... **titanium** phosphonate complexes. GD reacted with aluminum and **titanium** powder in the presence of water results in acid-dissolution of the ...

Investigation of Titanium Combustion Characteristics and Suppression Techniques Feb 1976 68 pages

Authors: Duane G. Fox; AIR FORCE AERO PROPULSION LAB WRIGHT-PATTERSON AFB OH

Full Text

This test program studies the burning characteristics of **titanium** under air flow conditions. The flat plate **titanium** samples are ignited by molten **titanium** from an electrically heated ignitor. Air flow conditions that support sustained ... burning. Argon gas is shown to be a feasible extinguishing agent for a **titanium** fire. Quick injection of a sufficient amount of ... a common fire extinguishing agent, is shown to sustain **titanium** burning at an

accelerated rate. The ultraviolet (UV) radiation emitted by burning **titanium** is shown to be of a sufficient intensity for existing UV fire detectors to ...

A Method to Produce Metal Matrix Composite Articles from Alpha-Beta Titanium Alloys. Dec 11, 1986 14 pages

Authors: Daniel Eylon; DEPARTMENT OF THE AIR FORCE WASHINGTON DC

Full Text

... invention relates to metal/fiber composite materials, and in particular, to **titanium** alloy matrix composites. Pure **titanium** is relatively soft, weak and extremely ductile. Through additions of other elements, the ... stiffness, corrosion resistance and usable ductility, coupled with low density. **Titanium** is allotropic. Up to 785 C, ... hexagonal close-packed crystal array called alpha phase. When **titanium** is heated above the transition temperature (beta transus) ... structure called beta phase. The addition of other elements to a **titanium** base will favor one or the other of the alpha or ...

Method to Produce Dispersion Strengthened Titanium Alloy Articles with High Creep Resistance. Jul 25, 1989 3 pages

Authors: Francis H. Froes; Daniel Eylon; DEPARTMENT OF THE AIR FORCE WASHINGTON DC

Full Text

... dispersion strengthened **titanium** alloys. The high strength-to-density ratio of **titanium** makes it a very attractive design choice in energy-efficient high thrust-to-weight gas turbine engines or airframes of modern airplanes. In **titanium**, the alloying elements tend to stabilize either the low-temperature ... phase. The important high-temperature properties for aerospace related applications of **titanium** alloys are: tensile strength, creep, fatigue initiation and ... is an object of the present invention to provide a method to produce **titanium** alloy articles having high creep resistance. Patents. ...

ANALYSIS OF A REFRACTORY COATING SYSTEM FOR THE THERMAL PROTECTION OF TITANIUM Sep 1963 32 pages

Authors: Raymond L. Farrow; Milton Levy; ARMY MATERIALS RESEARCH AGENCY WATERTOWN MA

Full Text

... ceramic refractory coatings are being considered to extend the useful life of **titanium** under conditions of high temperatures and erosive atmospheres. ... nickel-chrome, aluminum oxide, and copper, on the thermal characteristics of a **titanium** tube were investigated. The refractory composite system was ... to substrate, porosity of coatings, and effect of deposition on the structure of the **titanium** substrate. A comparison of the weights of the composite **titanium** tube ... weight reduction of 19 percent is effected by the use of the coated **titanium** system. The advantages and disadvantages of each coating are ...

FRACTURE-TOUGHNESS TESTS FOR TITANIUM ALLOY PLATE AND FORGINGS Apr 21, 1965 9 pages

Authors: R. W. Huber; R. J. Goode; NAVAL RESEARCH LAB WASHINGTON DC

Full Text

... to provide alloy selection design and specification criteria for the use of **titanium** alloys as hull materials for deep-diving submarines and for other structural ... applications. Although the Navy's primary interest is in 120-ksi yield strength alpha or near-alpha **titanium** alloys, the entire spectrum of **titanium** alloys is under study. The results obtained from laboratory fracture-toughness tests, such as the Charpy V-notch test (C sub ... of these studies show that it is possible to predict the expected structural performance of the **titanium** plate and forgings from the DWTT energy values through the ...

FRACTURE TOUGHNESS CHARACTERISTICS OF SOME TITANIUM ALLOYS FOR DEEP- DIVING VEHICLES Jul 28, 1965 11 pages

Authors: Robert J. Goode; Ralph W. Huber; NAVAL RESEARCH LAB WASHINGTON DC

Full Text

... notch-fracture-toughness characteristics of a wide variety of **titanium** alloy plate are being investigated to provide alloy selection design and specification criteria for the use of **titanium** alloys as hull-materials for deep-diving submarines and ... element test. A preliminary fracture diagram is presented for **titanium** which relates fracture toughness to strength ... of toughness. The fracture toughness characteristics of a number of **titanium** alloys and their relationship to the optimum ... processing investigation provide useful guidelines for optimization of strength and toughness of **titanium** alloys ...

Mechanism of Titanium Corrosion in Mineral Acids and Their Mixtures. Oct 10, 1973 13 pages

Authors: A. P. Brynza; L. I. Gerasyutina; E. A. Zhivotovskii; FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Full Text

The corrosion resistance and electromechanical behavior of **titanium** in solutions of sulphuric, hydrochloric, and phosphoric acid in ... identical solution acidity, the most aggressive with respect to **titanium** is sulphuric acid. The addition of sodium chloride and sulphate to phosphoric acid stimulates **titanium** dissolution. Sodium phosphates slow down **titanium** corrosion in sulphuric and hydrochloric acid slightly. The most effective in this respect is tertiary sodium phosphate. A foundation was developed for selecting a solution for the chemical removal of scale which forms on **titanium** at 780-820C.

COMPATIBILITY OF VAPOR DEPOSITED B, SIC, AND TIB2 FILAMENTS WITH SEVERAL TITANIUM MATRICES Feb 1968 33 pages

Authors: James A. Snide; AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OH

Full Text

... vapor deposited filaments with high purity, commercial purity **titanium**, and Ti- 6Al-4V. Filament-matrix diffusion sandwiches ... after 100 hours at 850-991C. The reaction of B with unalloyed **titanium** is characterized as the formation of a TiB2 layer adjacent to ... the TiB2 reaction layer. The SiC filament reacts with **titanium** to form a multi-phased reaction layer. The SiC-Ti interaction ... the reaction zone. A uniform distribution of 0.1 weight percent **titanium** was observed in the SiC filament after 100 hours at 850C. The TiB2 filament reacted with **titanium** to form a TiB layer adjacent to the filament.

Ballistic Impact Flash Resulting from Complete Projectile Penetration of Titanium Targets Dec 1975 144 pages

Authors: Joseph G. Aja; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH SCHOOL OF ENGINEERING

Full Text

The down range flash resulting from the perforation of thin **titanium** plates by high velocity steel spheres was investigated to quantify the magnitude and duration of this flash. The **titanium** flash was compared with the flash resulting from identical spheres impacting aluminum targets. Visually the **titanium** flash was significantly larger, but measurement of ... peak intensities were approximately the same. The duration time of the **titanium** flash was approximately five times as long as ... 80 microseconds later. Coating the impact surface of the **titanium** target with either white polyurethane paint, ...

Titanium Combustion in Turbine Engines. Jul 1979 132 pages

Authors: Thomas R. Strobridge ; John C. Moulder ; Alan F. Clark; NATIONAL BUREAU OF STANDARDS BOULDER CO THERMOPHYSICAL PROPERTIES DIV

Full Text

Pure and alloyed **titanium** components are routinely used in aircraft turbine engines because of their ... fatigue and corrosion resistance. Like most other metals, **titanium** is combustible under certain conditions of temperature, pressure ... concentration and in fact there have been several instances of **titanium** combustion in service engines. Contemporary **titanium** use in aircraft turbine engines and the limits of that use are explored. Combustion incidents and their ... of metal combustion and the experimental research related to **titanium** combustion are thoroughly treated and analytical combustion models ...

Filmwise Condensation of Steam on Horizontal Wire-Wrapped Smooth and Roped Titanium Tubes Sep 1992 248 pages

Authors: Thomas J. O'Keefe; NAVAL POSTGRADUATE SCHOOL MONTEREY CA

Full Text

... heat-transfer measurements were performed on horizontal smooth and roped **titanium** tubes using steam. The roped tubes were a commercially ... the modified Wilson plot. Results obtained for the wire-wrapped smooth **titanium** tubes showed a maximum enhancement of 30% as compared to a smooth **titanium** tube. This was for a tube using a 0.5 mm wire diameter (P/D = 7.92), corresponding to a ... of the tube covered by the wire of 12%. The LPD KORODENSE **titanium** tube showed an enhancement of 20% compared to a smooth **titanium** tube for both atmospheric and vacuum pressures. The addition of wrapping a wire in the ...

Wear Resistant Titanium Material Development Mar 1993 39 pages

Authors: D. G. Konitzer; N. O. Maurer; K. P. Taylor; GE AIRCRAFT ENGINES CINCINNATI OH

Full Text

A method for producing a dispersion of a hard phase in a **titanium** alloy is being studied. The purpose of the hard phase, **titanium** carbide in this work, is to improve the wear and erosion resistance of the **titanium** matrix. The hard plase has been developed in a wide range of volume fractions by nonconsumable arc melting.... **Titanium**, Wear, **Titanium** carbide, Hard phase, Erosion.

Fatigue Crack Growth Behavior of Small and Large Cracks in Titanium Alloys and Intermetallics Mar 1993 109 pages

Authors: K. S. Ravichandran; SYSTRAN CORP DAYTON OH

Full Text

... compilation of results of research performed on small fatigue cracks in **titanium** alloys and **titanium** aluminide intermetallics. The principal theme underlying this investigation ... such measurements could be made accurately on a number of candidate alloys systems comprising **titanium** alloys and newly developed **titanium** aluminide intermetallics. Fatigue crack growth rates could be accurately calculated and were correlated to data ... surface cracks continuously during fatigue crack growth were made in a near-alpha **titanium** alloy, Ti-6Al-2Sn-4Zr-6Mo. Crack aspect ratio measurements are demonstrated for ...

Sprue Design and Its Effect on the Castability and Porosity of Titanium Removable Partial Denture Frameworks Jun 10, 1997 148 pages

Authors: Alan J. Sutton; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH

Full Text

The use of **titanium** in dentistry has expanded steadily over the past thirty years. Many properties of **titanium** make it an ideal restorative material. **Titanium** has excellent corrosion resistance, fatigue resistance and biocompatibility. In addition, it has a low weight-to-volume ratio and a high strength-to-weight ratio. The primary dental application of this metal has been in the area of implantology. Recent advances in dental **titanium** casting machines allow for the use of **titanium** for crowns, fixed partial dentures, and removable partial denture frameworks.

Surface Failure of Titanium Carbide Cermet and Silicon Carbide Balls in Rolling Contact at Temperatures to 2000 degrees F Aug 1964 26 pages

Authors: Richard J. Parker; Salvatore J. Grisaffe; Erwin V. Zaretsky; NATIONAL AERONAUTICS AND SPACE ADMINISTRATION CLEVELAND OH LEWIS RESEARCH CENTER

Full Text

... fatigue tester was used to study the behavior of nickel- bonded **titanium** carbide cermet and self-bonded silicon carbide ... of 950 rpm with a mineral oil lubricant. The nickel-bonded **titanium** carbide - cermet balls were tested at ... shallow eroded area less than 1 mil deep for the **titanium** carbide cermet and 3 to 5 mils for the silicon carbide. ... life varies inversely with stress to a power that ranges from 9.7 to 10.5 for the **titanium** carbide cermet and from 6.9 to 8.6 for the silicon carbide. The load capacity of the **titanium** carbide and silicon carbide balls was 3 and 1 percent, respectively, that ...

Joining of Gamma Titanium Aluminides Sep 2002 114 pages

Authors: William A. Baeslack III; AIR FORCE RESEARCH LAB WRIGHT-PATTERSON AFB OH MATERIALS AND MANUFACTURING DIRECTORATE

Full Text

... of research and development performed on the joining of gamma **titanium** aluminides during the past two decades. Although ... those regarding the weldability and welding metallurgy of gamma **titanium** aluminides, are broadly applicable. Generally, the basic welding ... fusion and solid -state friction welding of conventional **titanium** alloys can also be applied to the welding of gamma **titanium** aluminides. However, the welding process parameters must be optimized, and in some instances the ... offer a range of mechanical property combinations. Gamma **titanium** aluminides can also be effectively joined using ...

Influence of Crystal Orientation on Friction Characteristics of Titanium Single Crystals in Vacuum Sep 1965 13 pages

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

Full Text

... (10(exp -9) mm Hg) with oriented single- crystal **titanium** rider specimens sliding on polycrystalline **titanium** disk specimens. Experiments were conducted at a surface speed of 2.28 centimeters per second and ... ((0001)) oriented in this same direction. The friction coefficient for **titanium** single crystals was less with the prismatic slip plane (primary slip plane for **titanium**) oriented parallel to the direction of sliding than with the basal slip ... texturing occurred at high loads on the single-crystal surface, and friction values were the same as for polycrystalline **titanium**.

Titanium Brazing for Structures and Survivability May 2007 12 pages

Authors: Kevin J. Doherty; Jason R. Tice; Steven T. Szewczyk; Gary A. Glide; ARMY RESEARCH LAB ABERDEEN PROVING GROUND MD WEAPONS AND MATERIALS RESEARCH DIRECTORATE

Full Text

Titanium is a candidate as a structural material for all new tactical and armored ground vehicles, because of ... corrosion resistance, and inherent ballistic resistance. However, **titanium** as a structural material is much less mature than both ... area of joining. While welding is the typical joining method for **titanium**, vacuum brazing is an option in areas that are difficult to access ... , such as ceramics. This work focuses on vacuum brazing of **titanium** (both Ti-6Al-4V and commercially pure **titanium**) and the effect of processing changes (alloy, temperature, pressure), including post-braze hot isostatic ...

Modeling of Microstructure Evolution During the Thermomechanical Processing of Titanium Alloys (Preprint) Jul 2008 73 pages

Authors: S L Semiatin; D U Furrer; AIR FORCE RESEARCH LAB WRIGHT-PATTERSON AFB OH MATERIALS AND MANUFACTURING DIRECTORATE

Full Text

Titanium and **titanium** alloys are widely used for a variety of aerospace, chemical, marine, and other specialty applications because of ... be obtained through microstructural modification. Microstructure evolution and control in **titanium** alloys is heavily dependent on the allotropic transformation from a hexagonal-close-packed crystal ... a body-centered-cubic crystal structure (denoted as beta phase) at high temperatures. For pure **titanium**, this occurs at 882 deg C. In many **titanium** alloys, the beta phase is partially stabilized at lower temperatures, and the equilibrium volume fractions of alpha and ...

THE SALT CORROSION OF TITANIUM ALLOYS AT ELEVATED TEMPERATURES Jan 15, 1961 195 pages

Authors: E. L. KOCHKA; V. C. Petersen; CRUCIBLE STEEL CO OF AMERICA MIDLAND PA

Full Text

... below 1100F is an over-all oxidation process that proceeds by the following steps: (1) chloride salt reacts with **titanium** and surface oxides with the liberation of chlorine; (2) chlorine attacks **titanium** metal; and (3) **titanium** chlorides oxidize. The reaction is sustained by (a) diffusion of salt into the oxide layer and (b) continued ... salt phase that forms and improves contact between alloy and corrodent. The attack of stressed super-alpha **titanium** alloys, processed below the beta transus, is centered in the grain boundaries. Alloys ...

SHORT TIME TENSILE AND CREEP PROPERTIES OF COMMERCIALLY PURE TITANIUM AND THREE TITANIUM ALLOYS Dec 7, 1962 35 pages

Authors: E.J. KING; BELL AEROSYSTEMS CO BUFFALO NY

Full Text

Data obtained for short time tensile and creep properties of commercially pure **titanium** (RC70)AND THREE **TITANIUM** ALLOYS (MST 821, 6Al-4V and B120VCA at 2500), 2250 and 2000 F are presented. These data indicate that the material possessing the greatest strength at 2500 F is the **titanium** alloy B120VCA.

STRUCTURAL DEVELOPMENT OF A TITANIUM. OCEANOGRAPHIC VEHICLE FOR OPERATING DEPTHS OF 15,000 TO 20,000 FEET Sep 1963 68 pages

Authors: Martin A. Krenzke; Thomas J. Kiernan; DAVID TAYLOR MODEL BASIN WASHINGTON DC

Full Text

This report presents the structural development of a **titanium** oceanographic vehicle capable of operating at depths of 15,000 to 20,000 ft. Emphasis is placed on the utilization of current **titanium** technology in the construction of the vehicle. To assist in the development, four **titanium** models were designed, fabricated according to feasible full-scale techniques, and tested to failure under external hydrostatic ... . Based on the test results, estimates are made of the ratio of weight to displacement required for **titanium** pressure hulls with collapse depths to 30,000 ft. The need to ...

FIRE HAZARDS ASSOCIATED WITH THE USE OF TITANIUM IN AIRCRAFT Jun 1964 8 pages

Authors: D. J. Maykuth; R. H. Ernst; BATTELLE MEMORIAL INST COLUMBUS OH DEFENSE METALS INFORMATION CENTER

Full Text Historically, **titanium** and its alloys have been proven capable of performing efficiently and satisfactorily in both airframe and aircraft gas-turbine engines. Nevertheless, under certain conditions, **titanium** and its alloys are known to be capable of ignition and combustion. ... of such fires. Laboratory tests have shown that sheets of commercially pure **titanium** and several of its alloys can be ignited in air ... torch and heating these materials to their melting temperatures (about 3000 F). The sensitivity of **titanium** toward ignition and combustion in oxygen atmospheres increases with increasing ...

U. S. ARMY REQUIREMENTS FOR TITANIUM ALLOYS WITH RESPECT TO VEHICULAR APPLICATIONS. ALPHA-BETA TITANIUM ALLOY May 1, 1959 43 pages

Authors: S. V. ARNOLD; WATERTOWN ARSENAL LABS MA

Full Text A survey is made of the problems which beset use of **titanium** in vehicles. Information is presented regarding experiences with regard to the costs of procuring **titanium** and fabricating prototypes over the past several years. Comparisons of estimated costs for **titanium** vs. steel and/or aluminum in a light armor vehicle application are included.

Total Results: **1000**

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Results per page: 50

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