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KEY=N - LANG RAIDEN

PROCESSING AND CHARACTERIZATION OF ALUMINA-NIOBIUM INTERFACES PRODUCED VIA LIQUID-FILM-ASSISTED JOINING

NUCLEAR SCIENCE ABSTRACTS

STRATEGIC MATERIALS AND COMPUTATIONAL DESIGN

John Wiley & Sons Contributions from three Focused Sessions that were part of the 34th International Conference on Advanced Ceramics and Composites (ICACC), in Daytona Beach, FL, January 24-29, 2010 are presented in this volume. The broad range of topics is captured by the Focused Session titles, which are listed as follows: FS1 - Geopolymers and other Inorganic Polymers; FS3 - Computational Design, Modeling Simulation and Characterization of Ceramics and Composites; and FS4 - Nanolaminated Ternary Carbides and Nitrides (MAX Phases). The session on Geopolymers and other Inorganic Polymers continues to attract growing attention from international researchers (USA, Australia, France, Germany, Italy, Czech Republic, and Viet Nam) and it is encouraging to see the variety of established and new applications being found for these novel and potentially useful materials. The session organizer gratefully acknowledges the support of the US Air Force Office of Scientific Research (AFOSR) through Dr. Joan Fuller. The AFOSR has continuously supported these conferences since the first meeting in Nashville, TN in 2003. Focused Session 3 was dedicated to design, modeling, simulation and characterization of ceramics and composites. 27 technical papers were presented on prediction of crystal structure and phase stability, characterization of interfaces and grain boundaries at atomic scale, optimization of electrical, optical and mechanical properties, modeling of defects and related properties, design of materials and components at different length scales, application of novel computational methods for processing. Four of these papers are included in this issue of CESP. Focused Session 4 was dedicated to MAX phases - a class of ternary carbides and nitrides with nanolaminated structure and general formula Mn+1AXn (where M is an early transition metal, A is an A-group element from IIIA to VIA, X is either C or N, and n=1, 2, 3 ...). The MAX phases have attracted recently a lot of attention because they

possess unique combination of metallic- and ceramic-like properties. In all, 30 technical papers were presented during this session. Four of these papers are included in this issue.

PHYSICS BRIEFS

PHYSIKALISCHE BERICHTE

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS

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SPUTTERED SUPERCONDUCTING FILMS OF NB, NB-AL, AND NB-AL-GE

ENERGY RESEARCH ABSTRACTS

BIBLIOGRAPHY

Walter de Gruyter By browsing about 10 000 000 scientific articles of over 200 major journals some 200 000 publications were selected. The extracted data is part of the following material research fields: crystal structures (S), phase diagrams (C) and intrinsic physical properties (P). These research field codes as well as the chemical systems investigated in each publication were included in the present work. The aim of this Bibliography is to provide researchers with a comprehensive compilation of all up to now published scientific publications on inorganic systems in only three handy volumes.

CHARACTERIZATION OF MINERALS, METALS, AND MATERIALS 2016

John Wiley & Sons Characterization is an important and fundamental step in material research before and after processing. This bookfocuses on the characterization of minerals, metals, and materials as well as the application of characterization results on the processing of these materials. It is a highly authoritative collection of articles written by experts from around the world. The articles center on materials characterization, extraction, processing, corrosion, welding, solidification, and method development. In addition, articles focus on clays, ceramics, composites, ferrous metals, non-ferrous metals, minerals, electronic, magnetic, environmental, advanced and soft materials. This book will serve the dual purpose of furnishing a broad introduction of the field to novices while simultaneously serving to keep subject matter experts up-to-date.

SENTIMENT ANALYSIS FOR SOCIAL MEDIA

MDPI Sentiment analysis is a branch of natural language processing concerned with the study of the intensity of the emotions expressed in a piece of text. The automated analysis of the multitude of messages delivered through social media is one of the hottest research fields, both in academy and in industry, due to its extremely high potential applicability in many different domains. This Special Issue describes both technological contributions to the field, mostly based on deep learning techniques, and specific applications in areas like health insurance, gender classification, recommender systems, and cyber aggression detection.

MELTS

MATERIALS TRANSACTIONS, JIM.

CERAMIC ABSTRACTS

ATOMIC-SCALE CHARACTERIZATION OF INTERFACES AND DEFECTS IN ELECTRONIC HETEROSTRUCTURES

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METALS ABSTRACTS

ELECTRONIC CHARACTERISTICS AND ELECTRON-PHONON INTERACTION IN SUPERCONDUCTING METALS AND ALLOYS

Springer

JAPANESE JOURNAL OF APPLIED PHYSICS

REGULAR PAPERS & SHORT NOTES

DIFFUSION AND DEFECT DATA

SOLID STATE PHENOMENA

BULK METALLIC GLASSES AND THEIR COMPOSITES

ADDITIVE MANUFACTURING AND MODELING AND SIMULATION

Walter de Gruyter GmbH & Co KG The book provides a comprehensive state-of-the-art review on the topic of bulk metallic glass matrix composites and understanding of mechanisms of development of composite microstructure. It discusses mechanisms of formation and toughening both during conventional casting routes and additive manufacturing. The second edition encompasses new studies and highlights advancement in mechanical properties, characterization, processing and applications.

MATERIALS FORUM

HIGH PERMEABILITY TERNARY PALLADIUM ALLOY MEMBRANES WITH IMPROVED SULFUR AND HALIDE TOLERANCES

The project team consisting of Southwest Research Institute{reg_sign} (SwRI{reg_sign}), Georgia Institute of Technology (GT), the Colorado School of Mines (CSM), TDA Research, and IdaTech LLC was focused on developing a robust, poison-tolerant, hydrogen selective free standing membrane to produce clean hydrogen. The project completed on schedule and on budget with SwRI, GT, CSM, TDA and IdaTech all operating independently and concurrently. GT has developed a robust platform for performing extensive DFT calculations for H in bulk palladium (Pd), binary alloys, and ternary alloys of Pd. Binary alloys investigated included Pd96M4 where M = Li, Na, Mg, Al, Si, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Y, Zr, Nb, Mo, Tc, Ru, Rh, Ag, Cd, In, Sn, Sb, Te, Hf, Ta, W, Re, Os, Ir, Pt, Au, Tl, Pb, Bi, Ce, Sm, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu. They have also performed a series of calculations on Pd--0Cu26Ag4, Pd--0Cu26Au4, Pd--0Cu26Ni4, Pd--0Cu26Pt4, and Pd--0Cu26Y4. SwRI deposited and released over 160 foils of binary and ternary Pd alloys. There was considerable work on characterizing and improving the durability of the deposited foils using new alloy compositions, post annealing and ion bombardment. The 10 and 25 [mu]m thick films were sent to CSM, TDA and IdaTech for characterization and permeation testing. CSM conducted over 60 pure gas permeation tests with SwRI binary and ternary alloy membranes. To date the PdAu and PdAuPt membranes have exhibited the best performance at temperatures in the range of 423-773 C and their performance correlates well with the predictions from GT. TDA completed testing under the Department of Energy (DOE) WGS conditions on over 16 membranes. Of particular interest are the PdAuPt alloys that exhibited only a 20% drop in flux when sulfur was added to the gas mixture and the flux was completely recovered when the sulfur flow was stopped. IdaTech tested binary and ternary membranes on a simulated flue gas stream and experienced significant difficulty in mounting and testing the sputter deposited membranes. IdaTech was able to successfully test PdAu and PdAuPt membranes and saw similar sulfur tolerance to what TDA found. The Program met all the deliverables on schedule and on budget. Over ten presentations at national and international conferences were made, four papers were published (two in progress) in technical journals, and three students (2 at GT

and 1 at CSM) completed their doctorates using results generated during the course of the program. The three major findings of program were; (1) the DFT modeling was verified as a predictive tool for the permeability of Pd based ternary alloys, (2) while magnetron sputtering is useful in precisely fabricating binary and ternary alloys, the mechanical durability of membranes fabricated using this technique are inferior compared to cold rolled membranes and this preparation method is currently not ready for industrial environments, (3) based on both modeling and experimental verification in pure gas and mixed gas environments PdAu and PdAuPt alloys were found to have the combination of the highest permeability and tolerance to sulfur.

PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM ON METAL-HYDROGEN SYSTEMS, FUNDAMENTALS AND APPLICATIONS (MH2000)

OCTOBER 1-6, 2000, NOOSA HEADS, QUEENSLAND, AUSTRALIA

SYNTHESIS AND TRANSPORT PROPERTIES OF 2D TRANSITION METAL CARBIDES (MXENES)

Linköping University Electronic Press Since the isolation and characterization of graphene, there has been a growing interest in 2D materials owing to their unique properties compared to their 3D counterparts. Recently, a family of 2D materials of early transition metal carbides and nitrides, labelled MXenes, has been discovered (Ti2CTz, Ti3C2Tz, Mo2TiC2Tz, Ti3CNTz, Ta4C3Tz, Ti4N3Tz among many others), where T stands for surface-terminating groups (O, OH, and F). MXenes are mostly produced by selectively etching A layers (where A stands for group A elements, mostly groups 13 and 14) from the MAX phases. The latter are a family of layered ternary carbides and/or nitrides and have a general formula of Mn+1AXn (n = 1-3), where M is a transition metal and X is carbon and/or nitrogen. The produced MXenes have a conductive carbide core and a non-conductive O-, OH- and/or F-terminated surface, which allows them to work as electrodes for energy storage applications, such as Li-ion batteries and supercapacitors. Prior to this work, MXenes were produced in the form of flakes of lateral dimension of about 1 to 2 microns; such dimensions and form are not suitable for electronic characterization and applications. I have synthesized various MXenes (Ti3C2Tz, Ti2CTz and Nb2CTz) as epitaxial thin films, a more suitable form for electronic and photonic applications. These films were produced by HF, NH4HF2 or LiF + HCl etching of magnetron sputtered epitaxial Ti3AlC2, Ti2AlC, and Nb2AlC thin films. For transport properties of the Ti-based MXenes, Ti2CTz and Ti3C2Tz, changing n from 1 to 2 resulted in an increase in conductivity but had no effect on the transport mechanism (i.e. both Ti3C2Tx and Ti2CTx were metallic). In order to examine whether the electronic properties of MXenes differ when going from a few layers to a single flake, similar to graphene, the electrical characterization of a single Ti3C2Tz flake with a lateral size of about 10 ?m was performed. These measurements, the first for MXene, demonstrated its metallic nature, along with determining the nature of the charge carriers and their mobility. This indicates that Ti3C2Tz is inherently of 2D nature independent of the number of stacked layers, unlike graphene, where the electronic properties change based on the number of stacked layers. Changing the transition

metal from Ti to Nb, viz. comparing Ti2CTz and Nb2CTz thin films, the electronic properties and electronic conduction mechanism differ. Ti2CTz showed metallic-like behavior (resistivity increases with increasing temperature) unlike Nb2CTz where the conduction occurs via variable range hopping mechanism (VRH) - where resistivity decreases with increasing temperature. Furthermore, these studies show the synthesis of pure Mo2CTz in the form of single flakes and freestanding films made by filtering Mo2CTz colloidal suspensions. Electronic characterization of free-standing films made from delaminated Mo2CTz flakes was investigated, showing that a VRH mechanism prevails at low temperatures (7 to ? 60 K). Upon vacuum annealing, the room temperature, RT, conductivity of Mo2CTx increased by two orders of magnitude. The conduction mechanism was concluded to be VRH most likely dominated by hopping within each flake. Other Mo-based MXenes, Mo2TiC2Tz and Mo2Ti2C3Tz, showed VRH mechanism at low temperature. However, at higher temperatures up to RT, the transport mechanism was not clearly understood. Therefore, a part of this thesis was dedicated to further investigating the transport properties of Mo-based MXenes. This includes Mo2CTz, out-of-plane ordered Mo2TiC2Tz and Mo2Ti2C3Tz, and vacancy ordered Mo1.33CTz. Magneto-transport of free-standing thin films of the Mo-based MXenes were studied, showing that all Mo-based MXenes have two transport regimes: a VRH mechanism at lower temperatures and a thermally activated process at higher temperatures. All Mo-based MXenes except Mo1.33CTz show that the electrical transport is dominated by inter-flake transfer. As for Mo1.33CTz, the primary electrical transport mechanism is more likely to be intra-flake. The synthesis of vacancy ordered MXenes (Mo1.33CTz and W1.33CTz) raised the question of possible introduction of vacancies in all MXenes. Vacancy ordered MXenes are produced by selective etching of Al and (Sc or Y) atoms from the parent 3D MAX phases, such as (Mo2/3Sc1/3)2AlC, with in-plane chemical ordering of Mo and Sc. However, not all quaternary parent MAX phases form the in-plane chemical ordering of the two M metals; thus the synthesis of the vacancy-ordered MXenes is restricted to a very limited number of MAX phases. I present a new method to obtain MXene flakes with disordered vacancies that may be generalized to all quaternary MAX phases. As proof of concept, I chose Nb-C MXene, as this 2D material has shown promise in several applications, including energy storage, photothermal cell ablation and photocatalysts for hydrogen evolution. Starting from synthetizing (Nb2/3Sc1/3)2AlC quaternary solid solution and etching both the Sc and Al atoms resulted in Nb1.33C material with a large number of vacancies and vacancy clusters. This method may be applicable to other quaternary or higher MAX phases wherein one of the transition metals is more reactive than the other, and it could be of vital importance in applications such as catalysis and energy storage.

IEEE TRANSLATION JOURNAL ON MAGNETICS IN JAPAN

LOW TEMPERATURE PHYSICS

PROCEEDINGS OF THE 16TH INTERNATIONAL CONFERENCE ON LOW

TEMPERATURE PHYSICS, LT-16

UNIVERSITY OF CALIFORNIA, LOS ANGELES, 19-25 AUGUST 1981

JAPANESE TECHNICAL ABSTRACTS

PROCEEDINGS OF THE 16TH INTERNATIONAL CONFERENCE ON LOW TEMPERATURE PHYSICS : LT-16 ; UNIVERSITY OF CALIFORNIA, LOS ANGELES, 19 - 25 AUGUST 1981. 3. INVITED PAPERS AND POST-DEADLINE CONTRIBUTED PAPERS

U.S. GOVERNMENT RESEARCH & DEVELOPMENT REPORTS

PHYSICA B + C.

Part B has subtitle: Low temperature and solid state physics and part C has subtitle: Atomic, molecular and plasma physics; optics

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