



**RESEAU FRANÇAIS DE  
MECANOSYNTHESE**

**Lettre N°93**

**Décembre 2002**

**189 Groupes de Recherche  
(dont 115 à l'étranger / 34 Pays)**

**Bureau du RFM : E. Gaffet (Président)  
G. Le Caër (Secr. Gén.), A.R. Yavari (Trés.)**

**International Editorial LRFM Committee**

P. Balaz - Institute of Geotechnics - Slovak Academy of Science - Slovakia  
G. Le Caër - LSG2M - CNRS - France  
A. Calka - Dpt Materials Engineering - Univ. Wollongong - Australia  
E. Gaffet (Coord.) - Nanomaterials Research Group - CNRS - France  
S.H. Hong - Dpt Materials Science and Engineering - KAIST - Korea  
E. Ivanov - Tosoh - USA  
M. Senna - Faculty of Science and Technology - Japan  
L. Takacs - Dpt Physics - Univ. Maryland - USA

**Bulletin d'adhésion 2002 / Subscription Print**

(à retourner à l'adresse suivante - to be sent at the following address) :

Eric GAFFET

CNRS UMR5060 « Métallurgies et Cultures »

Nanomaterials Research Group

Site de Sévenans (UTBM) - F90010 - Belfort Cedex - France

Nom/Name : .....Prénom / First Name : .....

Adresse complète / Full Address : .....

Téléphone/ Phone: .....Télécopie (Fax) : .....

e\_Mel. / e-Mail : .....

désire adhérer au Réseau Français de Mécanosynthèse / want to become a member of the French Mechanical Alloying Network

Chèque ci joint / Check enclosed in the amount of **20 Euros (20€)**

The check has to be to the order to : Réseau Français de Mécanosynthèse

Le site web du RFM est :

<http://www.bls.fr/amatech>

Rubrique Pages Sciences et Techniques pour l'Ingénieur (Rubrique Sciences)

⇒ vous y trouverez les anciennes lettres du RFM (accessible par Adobe Acrobat), les statuts du RFM ainsi que les annonces concernant les JRFM'2001 et quelques éléments mis à jour régulièrement concernant les derniers résultats dans ce domaine.

=====  
**Congress and School Announcements**  
=====

**The 10th Int. Symposium on Metastable, Mechanically Alloyed and Nanocrystalline Materials,  
ISMANAM 2003,  
will be held in Foz do Iguacu,  
Brazil, on 24-28 August 2003**

<mailto:ismanam2003@dema.ufscar.br>  
<http://www.dema.ufscar.br/ismanam2003>

-----  
**International Conference  
NANOMATERIALS AND NANOTECHNOLOGIES (NN 2003),  
Crete, Greece; August 30 - September 6, 2003**

<http://www.ipme.ru/ipme/conf/NN2003/>  
-----

**Fourth INTERNATIONAL CONFERENCE  
ON MECHANOCHEMISTRY AND MECHANICAL ALLOYING  
4th INCOME 2003**

Technical University of Braunschweig, Braunschweig, Germany  
September 7-11, 2003

Website : <http://www.tu-bs.de/INCOME2003>

*Dear Colleagues,*

*On behalf of the INCOME 2003 Organising Committee we have pleasure to announce the 4th International Conference on Mechanochemistry and Mechanical Alloying (INCOME 2003) that will be held in Braunschweig, Germany, on 7-11 September 2003. The website of the conference is now available on: <http://www.tu-bs.de/INCOME2003>  
Preregistration can be done via the website, by email, fax or mail. We are happy to inform you that the Conference is supported by the German Science Foundation DFG: <http://www.dfg.de> It enables us to offer relatively low registration fees. Please keep also in mind that the proceedings of the Conference will be published in Journal of Materials Science <http://www.kluweronline.com/issn/0022-2461> by Kluwer Academic Publishers.*

*We do hope that you and your colleagues will be able to come to Braunschweig to attend INCOME 2003!*

*Best regards,*

*K. D. Becker, V. Sepelak  
Organisers INCOME 2003  
[INCOME2003@tu-bs.de](mailto:INCOME2003@tu-bs.de)  
<http://www.tu-bs.de/INCOME2003>*

*Institute of Physical and Theoretical Chemistry  
Technical University of Braunschweig  
Hans-Sommer-Strasse 10  
D-38106 Braunschweig  
Germany*

*Phone: +49-531-3916341  
Fax: +49-531-3917305*

-----  
**XV. International Symposium on Reactivity of Solids:  
Nov. 9. - 13. 2003**

*(from Dr. M. Senna)*

*Dear RFM members, all of you are welcome since you all are related with some of the topics contained.*

*Please visit our official home page  
[www.ISRSKYOTO.org](http://www.ISRSKYOTO.org)*

*All the quations are wolcome to:  
[info@ISRSKYOTO.org](mailto:info@ISRSKYOTO.org)*



-----  
**The 10th Int. Symposium on Metastable, Mechanically Alloyed and Nanocrystalline Materials,  
ISMANAM 2003,**

**will be held in Foz do Iguacu,  
Brazil, on 24-28 August 2003.**

*We do hope you (and your colleagues) will be able to come to Brazil to  
attend ISMANAM-2003.*

*Walter J. Botta F.*

*Claudio S. Kiminami*

Organizers ISMANAM-2003

<mailto:ismanam2003@dema.ufscar.br>

<http://www.dema.ufscar.br/ismanam2003>

QuickTime™ et un décompresseur  
Photo - JPEG sont requis pour visualiser  
cette image.

QuickTime™ et un décompresseur  
Photo - JPEG sont requis pour visualiser  
cette image.



-----  
**International Conference  
NANOMATERIALS AND NANOTECHNOLOGIES (NN 2003),  
Crete, Greece; August 30 - September 6, 2003**

<http://www.ipme.ru/ipme/conf/NN2003/>

**CALL FOR PAPERS**



**International Conference**

**NANOMATERIALS AND NANOTECHNOLOGIES (NN 2003),  
Crete, Greece; August 30 - September 6, 2003**

The objective of this Conference is to highlight current and future multidisciplinary research on nanostructured materials and development of nanotechnologies with the primary focus on reinforce of connection between the fundamental science, engineering and commercialization of nanostructures; between universities, governmental laboratories, academic institutions, private research sector and industry. This Conference aims to assess the current status and to identify future priority directions of fabrication, research, design and applications of nanocomposites, carbon nanotubes, self-assembled supramolecules, nanostructured bulk solids, films and coatings, quantum dots and wires. Particular emphasis will be placed on developing close interactions among scientists and engineers from Asia, Europe, and North America and fostering future transdisciplinary and multi-institutional collaboration in this new and rapidly growing area.

We plan to focus on the following topics:

Synthesis and processing; Characterization and properties; Theory and modeling; Applications and commercialization.

In the framework of the NN 2003 Conference, round table discussions will be arranged with focuses placed on enhancement of interactions between universities, industry, governmental labs, foundations and agencies in the area of nanoscience and nanotechnology. We hope these discussions will provide a good opportunity to share views of scientists, officers of science and representatives of industry from America, Europe and Asia on this very intriguing topic.

**Conference chair:** I.A.Ovid'ko (Russian Academy of Sciences)

**International Organizing Committee:** M.-I. Baraton (University of Limoges, France); G.-M. Chow (National University of Singapore, Singapore); J.Th.M. De Hosson (University of Groningen, The Netherlands); G. Kiriakidis (IESL, FORTH, Greece); E. Lavernia (University of California, Davis, USA); H.S.Nalwa (American Scientific Publ., USA); C.S. Pande (Naval Research Laboratory, USA); H.-E. Schaefer (Stuttgart University, Germany); S. Seal (University of Central Florida, USA); R.D. Shull (National Institute of Standards and Technology, USA); G. Skandan (Nanopowder Enterprises Inc., USA); V. Teixeira (University of Minho, Portugal); T. Tsakalagos (Rutgers University, USA)

**Invited speakers (a partial list):**

**L. Ajdelsztajn** (University of California at Davis, USA); **C.C.Berndt** (State University of New York at Stony Brook, USA); **M.F.de Costa** (University of Minho, Portugal); **J.Eastman** (Argonne National Laboratory, USA); **J.Groza** (University of California at Davis, USA); **G.Hajipanayis** (University of Delaware at Newark, USA); **C.S.Hartley** (AFRL/AFOSR, USA); **W.L.Haworth** (National Science Foundation, USA); **C.C.Koch** (North Carolina University, USA); **S.Logothetidis** (Aristotle University of Thessaloniki, Greece); **Yu.Mishin** (George Mason University, USA); **N.F.Morozov** (St.Petersburg State University, Russia); **R.G.Reddy** (University of Alabama at Tuscaloosa, USA); **B.K.Rao** (Virginia Commonwealth University, USA); **J.Speck** (University of California at Santa Barbara, USA); **S.K.Sundaram** (North-Pacific National Laboratory, USA), **R.A.Suris** (Ioffe Physico-Technical Institute (RAS), Russia); **S.Veprek** (Technical University Munich, Germany); **R. Wuerschum** (Technische Universitaet Graz, Austria)

**Location:** The Conference will be held in Creta Maris Hotel, de-luxe (five-star) hotel situated on the north coast of Crete, 25 km east of Heraklion airport on its own golden beach. The Creta Maris is ranked among the best deluxe hotels in Greece and provides a perfect holiday or incentive atmosphere with unmatched hotel facilities, services and cuisine. For more information, please visit: <http://www.maris.gr>





**ROOM RATES :**

Double room (two-persons occupancy) on Half Board basis (breakfast and dinner), per person, per day: 85,50 Euros

Single room on Half Board basis (breakfast and dinner), per day: 130,81 Euros

Extra Beds Supplements: 3<sup>rd</sup> adult in Double room: 46,35 Euros per day (half board)

Child (2-12 years Old): 42,75 euros per day (half board)

The number of 4 bedded rooms is limited .

Also, accommodation is possible to be arranged in four- and three-star hotels being in walking distance from Creta Maris Hotel. For details on accommodation, please be in touch with Mrs. Maria Prodromitis (Select Tourist Agency; phone: +(30 810) 344 206 fax: +(30 810) 344 206

email: [select@hellasnet.gr](mailto:select@hellasnet.gr) or [mariaselect@hellasnet.gr](mailto:mariaselect@hellasnet.gr) )

Registration fee: US\$ 400

**IMPORTANT DEADLINES:**

Abstract submission: December 15, 2002

Notification on acceptance of abstracts: April 1, 2003

Manuscript submission: July 1, 2003

NN 2003 Proceedings will be published in [Reviews on Advanced Materials Science](#) Journal.

Submission of Abstracts for Oral and Poster Presentations: Anyone interested in making a contribution to the Conference is invited to submit by email a half page abstract with an application form (Word or PDF formats) to Prof. Ilya Ovid'ko, email: [nn2003@def.ipme.ru](mailto:nn2003@def.ipme.ru) ) by DECEMBER 15, 2002. In the near future, submission of NN 2003 abstracts via on-line will be arranged at the web-site: <http://www.ipme.ru/ipme/conf/NN2003/> (If an author has multiple authors who each wish an invitation to attend the Conference, each author must submit a separate application.)

**APPLICATION FORM**

NANOMATERIALS AND NANOTECHNOLOGIES (Crete, Greece, August 30 - September 6, 2003 )

First Name: Last Name (Surname):

Title (Dr., Prof, ...): Job Title:

Organization or Company:

Mailing Address:

Country:

Phone: Fax:

E-mail:

Abstract including abstract title, author listing (affiliation, mailing address, phone, fax and email address for each author), abstract text (approximately 100-150 words), key words, preference for “oral presentation” or “poster presentation”.

Contact (Conference chair): Ilya Ovid'ko, Dr.Sci., Professor

Principal Editor, [Materials Physics and Mechanics](#) Journal / Principal Editor, [Reviews on Advanced Materials Science](#) Journal

Head, Laboratory for Theory of Defects in Materials, Institute of Problems of Mechanical Engineering (Russian Academy of Sciences), Bolshoj 61, Vas.Ostrov, St.Petersburg 199178, Russia

Fax: +7(812)321 4771, Email: [ovidko@def.ipme.ru](mailto:ovidko@def.ipme.ru) / Abstract submission: [nn2003@def.ipme.ru](mailto:nn2003@def.ipme.ru)

<http://www.ipme.ru/ipme/labs/ltdm/ovidko.html>

The NN 2003 conference web-site: <http://www.ipme.ru/ipme/conf/NN2003/>



Lettre RFM N°93 - Décembre 2002  
Corresp. : <mailto:Eric.Gaffet@utbm.fr>

\*\*\*\*\*  
**Job Vacancies, Ph D Position and, Post Doc Position  
Requests – Proposals**

From Ch. Gras  
(On the 28/10/ 2002)

**POST-DOCTORAL RESEARCHERS**

**JOINT APPOINTMENT WITH OXFORD E-SCIENCE CENTRE  
Post-doctoral Research Fellow: Grid Support (Remote Microscopy)  
Grade RSII / Salary: £25,451 - £29,621 pa / Job Ref DJ02/035**

The **University of Oxford** has recently won major Government funding for a core e-Science funded testbed project and seeks to appoint a Research Associate to develop Grid based software to operate a scanning electron microscope remotely in a collaboration between researchers in the department of Materials and the Oxford e-Science Centre. For further information on the project see: <<http://www-em.materials.ox.ac.uk/research/remote/index.htm>><http://www-em.materials.ox.ac.uk/research/remote/index.htm>.

The appointee will design architecture and middleware for remote control of a scanning electron microscope, for which s/he will have or will develop expertise in GLOBUS and Web Services, and will provide Systems Administration for the IT infrastructure. The position involves interfacing with the UCSD team (<<http://www.npaci.edu/Alpha/telescience.html>><http://www.npaci.edu/Alpha/telescience.html>) and with the microscope designer JEOL.

Candidates must have a good first degree and either a higher degree or extensive experience in a scientific/engineering/computing discipline. They should also have considerable technical experience in a computing environment, knowledge of systems administration, the ability quickly to grasp and assess new software technologies, together with some knowledge of the UK e-Science initiative. Excellent communication and inter-personal skills with the ability to work with and supervise a wide variety of people are expected. Experience of using Globus and/or J2EE web services such as IBM WebSphere, and experience of real time control systems would be an advantage. Some international travel is envisaged.

The post is available initially for up to 3 years duration, although it is expected that additional funding will be sought and the prospects for extension are good. Appointment will be in the range indicated above, dependent on qualifications and experience. However, if applicants with sufficient qualifications and experience are not forthcoming, an appointment in the RSIA range (£18,265 - £27,339) may be considered with a commensurate reduction in duties and responsibilities.

Before submitting an application, candidates should obtain <DJ02-035.pdf>further particulars from the website or from the Deputy Administrator (Academic), Department of Materials, University of Oxford, Parks Road, Oxford OX1 3PH (email: <<mailto:posts@materials.ox.ac.uk>>[posts@materials.ox.ac.uk](mailto:posts@materials.ox.ac.uk)), or telephone 01865 273750, quoting reference DJ02/035. The closing date for applications is 15 November 2002 and interviews are planned for 29 November 2002.

See also <<http://www.ox.ac.uk/staff.html>><http://www.ox.ac.uk/staff.html>

-----  
FROM marc.descamps@univ-lille1.fr  
16/09/2002

Le Laboratoire de Dynamique et Structure Des Materiaux Moleculaires (LDSMM)  
UMR CNRS 8024 -Université LILLE1

recherche -de toute urgence (curriculum à envoyer pour le 24 septembre)

• un post doc non français,these realisée en dehors de la france , pour 6mois, position ATER.

salaires: environ 1500 euros par mois.

thématique: mecanosynthèse de materiaux organiques et substances à interet  
pharmaceutique

• un chercheur non français senior (curriculum pour le 5 Octobre) sur une position de 3 mois ou de 6 mois  
en mecanosynthèse de matériaux organiques et substances pharmaceutiques

CONTACT marc.descamps@univ-lille1.fr

tel:33 (0) 3 20 43 49 79  
-----

From Ch. Gras  
(On the 19/08/2002)

**POST-DOCTORAL POSITION IN POWDER DIFFRACTION AT IPNS**



Lettre RFM N°93 - Décembre 2002  
Corresp. : <mailto:Eric.Gaffet@utbm.fr>

Argonne National Laboratory, one of the nation's premier scientific research and development organizations, located 20 miles southwest of Chicago, is now looking to fill a post-doctoral position in the Intense Pulsed Neutron Source (IPNS) Division, a facility dedicated to materials science research using neutron scattering techniques.

The successful applicant will join the General Purpose Powder Diffractometer (GPPD) instrument team at IPNS, participate in user-initiated as well as independent scientific programs, and join in commissioning the upgraded GPPD (to be completed in 2003). Ongoing scientific activities include: (1) crystal chemistry and structure-property relationships in catalytic materials; (2) crystallographic and dynamics studies of occluded zeolites - particularly directed at guest-framework interactions; and (3) residual strain/crystallographic texture measurements in alloys and composites, including strain and orientation distribution function determinations. A PhD degree awarded within the last three years in a discipline such as chemistry, materials science or physics is required. Highly desirable is a motivated scientist with a strong background in diffraction and crystallography, including familiarity with x-ray and neutron scattering, powder diffraction and structure/property relationships.

We welcome applications from candidates who can contribute to our EEO/Affirmative Action goals. Interested candidates should submit a curriculum vitae, three letters of recommendation, and a statement of research interests.

Susan M. Walker  
Employment and Placement  
Box No. IPNS-JWR  
Argonne National Laboratory  
9700 S. Cass Avenue, Argonne, IL 60439.  
Fax: 630-252-9388, Email: [employment@anl.gov](mailto:employment@anl.gov).

Technical questions concerning this position should be addressed to J. W. Richardson ([jwrichardson@anl.gov](mailto:jwrichardson@anl.gov))

**POSTDOCTORAL RESEARCH ASSISTANT IN MODELLING OF PHASE-CHANGE MATERIALS**  
**Research Staff Grade RAIA / Salary: £17,626 - £26,491 / Job Ref: DJ02/033**

Applications are invited for a postdoctoral position, available for up to three years, to model electron transport in phase-change materials. The project is funded by the Hewlett-Packard Laboratory (HPL) in Palo Alto as part of ongoing research into advanced data storage devices. The research will involve the extension of a highly-successful Monte Carlo model for film growth to ternary systems and the development of an in-house Tight-Binding code for electron transport to phase-change materials of interest to HPL. The research programme will be led by Professor David Pettifor FRS.

The successful applicant will be expected to interact closely with experimentalists at HPL, visiting Palo Alto at least every six months. Candidates should have a good first degree and completed a doctorate (by the time of appointment) in physics, materials or a related physical science subject, and should show evidence of the required modelling skills, together with knowledge of their fundamental concepts. Excellent verbal and written communication skills in English (the project language), and the ability to work to agreed time-scales, both independently and in a team, are essential.

Before submitting an application, candidates should obtain further particulars available from The Deputy Administrator (Teaching), Department of Materials, University of Oxford, Parks Road, Oxford OX1 3PH (email: [posts@materials.ox.ac.uk](mailto:posts@materials.ox.ac.uk)), or telephone 01865 273750 quoting reference: DJ02/033. The closing date for applications is 9 August 2002 and interviews are planned for 30 August 2002. Further information on the Department may be found on the web-site: <http://www.materials.ox.ac.uk>

**POSTDOCTORAL RESEARCH ASSISTANT IN MODELLING OF CARBON NANOSTRUCTURES**  
**Research Staff Grade RAIA / Salary: £17,626 - £26,491 / Job Ref: DJ02/029**

Oxford and Cambridge Universities are working together with Hitachi Europe Ltd. to produce radically new devices for future computing, in a project jointly funded by a Foresight LINK Award from the Department of Trade and Industry and Hitachi Europe Ltd. The project brings together research in physics, chemistry, materials science and electronics engineering to make prototype structures for advance conventional computing and for the new field of quantum computing. See [www.nanotech.org](http://www.nanotech.org). Applications are invited for a postdoctoral position in the first-principles modelling of the atomic and electronic properties of endohedral fullerenes within single walled carbon nanotubes. This position is funded until 30 September 2004 and will be supervised by Professor David Pettifor FRS.

The successful applicant will be expected to interact closely with experimentalists performing HREM, STM, EELS and Raman characterization within this LINK programme. Candidates should have a good first degree and completed a doctorate (by the time of appointment) in physics, chemistry or materials, and should show evidence of the required first principles modelling skills. Excellent verbal and written communication skills in English, and the ability to work independently and in a team within an agreed time-scale are essential.

Before submitting an application, candidates should obtain further particulars available from The Deputy Administrator (Teaching), Department of Materials, University of Oxford, Parks Road, Oxford OX1 3PH (email: [posts@materials.ox.ac.uk](mailto:posts@materials.ox.ac.uk)), or telephone 01865 273750 quoting reference: DJ02/029. The closing date for applications is 02 August 2002 and interviews are currently planned for the 29 August 2002. Further information on the Department may be found on the web-site: <http://www.materials.ox.ac.uk>

**POSTDOCTORAL RESEARCH ASSISTANT IN ATOMISTIC MODELLING**



Lettre RFM N°93 - Décembre 2002  
Corresp. : <mailto:Eric.Gaffet@utbm.fr>

**RESEARCH STAFF RAIA GRADE / Salary £17,626 - £26,491 pa / Ref. DJ02/031**

Atomistic Modelling: an immediate vacancy exists for a postdoctoral research appointment funded by the EU for the study of nanoscale amorphous layers in structural and functional ceramic materials. The project is part of an international collaboration of nine research institutions in Europe and the US, in which substantial intergroup communication and exchanges are expected, and is funded until January 2005.

This post will involve Grand Canonical Monte Carlo simulations of the equilibrium structure and composition of nanometre scale grain boundary films in silicon oxy-nitride, building on a very successful network model of non-stoichiometric glasses we have recently published in PRL. Ab initio simulations will be used to refine the structures and predict local electronic structures for comparison with experiment. This project will be led by Professors Adrian Sutton and David Pettifor.

The successful applicant will have a good first degree and have completed a doctorate (by the time of appointment) in materials, physics, or a related physical science subject. The post requires the ability to work both independently and collaboratively as part of a team. Candidates should show evidence of the required skills, and a considered interest in the particular field of research.

Before submitting an application, candidates should obtain further particulars from The Deputy Administrator (Teaching), Department of Materials, University of Oxford, Parks Road, Oxford OX1 3PH (email: [posts@materials.ox.ac.uk](mailto:posts@materials.ox.ac.uk)), or telephone 01865 273750 quoting reference: DJ02/031. The closing date for applications is 9 August 2002 and interviews are planned for 29 August 2002. Further information on the Department may be found on the web-site: <http://www.materials.ox.ac.uk>.

**MICROSTRUCTURAL CHARACTERISATION XRD & SEM SPECIALIST  
Research Staff grade RAIA / Salary £17,626 - £22,522 pa / Ref: DJ02/012**

Applications are invited from experienced scientists in microstructural characterisation. The Materials Department Services to Industry Characterisation and Analysis Service provides a problem solving and advisory service based on microanalytical techniques to internal research units and external commercial customers. The post holder will provide a high quality, fast turnaround X-ray diffraction (XRD) and scanning electron microscope (SEM) advisory and analytical service. He/she will assist with maintenance and servicing of the Department's analytical facilities, advise on the use of these techniques and in the interpretation of data, and assist in the training of students and other researchers in SEM and XRD techniques. The post is available for three years in the first instance.

Before submitting an application, candidates should obtain further particulars available from The Deputy Administrator (Teaching), Department of Materials, University of Oxford, Parks Road, Oxford OX1 3PH (email: [posts@materials.ox.ac.uk](mailto:posts@materials.ox.ac.uk)), or telephone 01865 273750 quoting reference: DJ02/012. The closing date for applications is 19 July 2002 and interviews are planned for the week beginning 29 July 2002. Further information on the Department may be found on the web-site: <http://www.materials.ox.ac.uk>

**MICROSTRUCTURAL CHARACTERISATION EPMA & SEM SPECIALIST  
Research Staff grade RAIA / Salary £17,626 - £26,491 pa / Ref: DJ02/013**

The post of Microstructural Characterisation EPMA & SEM Specialist in the Department of Materials is available for three years in the first instance, to start as soon as possible. Working as part of a small team, the post holder will be involved in providing a high quality, fast turnaround optical microscopy, EPMA & SEM advisory and analytical service to both internal and external customers, assisting with maintenance and servicing of the Department's analytical facilities and advising on the use of these techniques and in the interpretation of data, and participating in the training of students and other researchers in SEM, optical microscopy and EPMA techniques.

Applicants should hold a Materials Science degree and have a detailed understanding of crystallography and a proven, high-level competence in EPMA, with at least five years of sophisticated/advanced analytical expertise. They should be well-organised, have good inter-personal verbal and written communications skills, and an awareness of the financial implications of working with industry, be able to liaise with academic users and industrial customers, and be willing, on occasions, to travel within the UK.

Before submitting an application, candidates should obtain further particulars available from The Deputy Administrator (Teaching), Department of Materials, University of Oxford, Parks Road, Oxford OX1 3PH (email: [posts@materials.ox.ac.uk](mailto:posts@materials.ox.ac.uk)), or telephone 01865 273750, quoting reference: DJ02/013. The closing date for applications is 19 July 2002 and interviews are planned for the week beginning 29 July 2002. Further information on the Department may be found on the web-site: <http://www.materials.ox.ac.uk>



## Périodiques / Congrès

### [30] HYPERVELOCITY IMPACT CONSOLIDATION OF MECHANICALLY ALLOYED POWDER IN THE NI-AL-B SYSTEM

K Ayabe, T Okabe - IMPACT ENGINEERING AND APPLICATION, VOLS I AND II, 2001, pp 261-266 - 4TH INTERNATIONAL SYMPOSIUM ON IMPACT ENGINEERING; KUMAMOTO, JAPAN. JULY 16-18, 2001

Hypervelocity impact consolidation tests were performed at room temperature in expectation of a multiplication effect between mechanical alloying (MA) and combustion synthesis using MA powders composed of Ni-33.0mol% Al-xmol%B ( 0 and 1.0). The consolidation characteristics were examined as a function of MA milling duration. Some specimens underwent combustion synthesis directly on impact while others did not. The latter subsequently underwent a synthesis reaction by annealing at a comparatively low annealing temperature (near 673K). The density and micro Vickers hardness of the specimens annealed after impact were higher than those not annealed. The density reached a maximum at the optimum milling duration.

### [29] PREPARATION OF CO-CU METASTABLE BULK ALLOY BY MA AND SHOCK COMPRESSION

X Fan, T Mashimo, YY Zhang, A Chiba - IMPACT ENGINEERING AND APPLICATION, VOLS I AND II, 2001, pp 267-271 - 4TH INTERNATIONAL SYMPOSIUM ON IMPACT ENGINEERING; KUMAMOTO, JAPAN. JULY 16-18, 2001

Metastable solid solution alloy powders and the bulk bodies in the  $\text{Co}_x\text{Cu}(100-x)$  ( $x=10, 20, 30, 40, 50, 60, 70, 80, \text{ and } 90$ ) system, which was an almost immiscible system at ambient state, were prepared by mechanical alloying (MA) and shock compression. The MA-treated powders (for 21 hours) showed the X-ray diffraction (XRD) patterns of a single phase of face-centered cubic (FCC) structure, in which the lattice parameter changed with Cu content almost in accordance with Vegard's law. The XRD patterns of the shock-consolidated bulk bodies did not change much from those of the MA-treated powders. This showed that the metastable solid solution phases were successfully consolidated without decomposition or recrystallization.

### [28] THE EFFECT OF MECHANICAL MILLING ON THE SOLID STATE REACTIONS IN THE BARIUM OXALATE - IRON (III) OXIDE SYSTEM

V. Berbenni, A. Marini, N.J. Welham, P. Galinetto, M.C. Mozzati - Journal of the European Ceramic Society - vol 23/1 pp 179-187 (2002) The formation of barium hexaferrite,  $\text{BaFe}_{12}\text{O}_{19}$ , from a 1:6 molar ratio mixture of barium oxalate and iron oxide has been investigated. Thermogravimetry (TGA), high temperature X-ray powder diffraction (HT-XRPD), differential scanning calorimetry (DSC) and micro-Raman spectroscopy have been used to determine the effect of mechanical activation on the solid state reactions occurring during heating. The resulting magnetic properties were investigated measuring hysteresis loops. For the activated mixtures, the mass loss is over at  $\approx 600^\circ\text{C}$  i.e. well below the temperature where  $\text{BaCO}_3$  spontaneous decomposition is complete ( $T > 850^\circ\text{C}$ ). Such a noticeable temperature lowering is a consequence of the high energy milling enhancing the formation of  $\text{BaFe}_2\text{O}_4$ . After heating the milled mixture to  $850^\circ\text{C}$ ,  $\text{BaFe}_{12}\text{O}_{19}$  was rapidly formed from the  $\text{BaFe}_2\text{O}_4$  and residual  $\text{Fe}_2\text{O}_3$ . Starting from an unmilled mixture, only minor amounts of  $\text{BaFe}_{12}\text{O}_{19}$  were formed by heating to  $850^\circ\text{C}$ . The favourable formation of barium hexaferrite, when starting from milled powders, has been confirmed by micro-Raman spectroscopy. The powder from the activated sample was shown to have far better magnetic properties than the unactivated sample.

### [27] SOLID-STATE FORMATION OF LITHIUM FERRITES FROM MECHANICALLY ACTIVATED $\text{Li}_2\text{CO}_3 - \text{Fe}_2\text{O}_3$ MIXTURES

V. Berbenni, A. Marini, N.J. Welham, P. Matteazzi, R. Ricceri - Journal of the European Ceramic Society - vol 23/3 pp 529-538 (2002)

The formation of lithium ferrites ( $\text{LiFe}_5\text{O}_8$  and  $\text{LiFe}_2\text{O}_2$ ) from mechanically activated mixtures of  $\text{Li}_2\text{CO}_3 - \text{Fe}_2\text{O}_3$  has been studied using thermal analysis (TGA, DSC), evolved gas analysis (TG/FT-IR), X-ray powder diffraction (XRD), scanning electron microscopy (SEM) and particle size analysis.

It is shown that mechanical activation of the precursors considerably enhances the reactivity of the solid system analysed and makes it possible to obtain reaction products with a much lower expense of thermal energy. In particular, lithium ferrites can be obtained at temperatures least  $160^\circ\text{C}$  lower than those necessary in the absence of mechanical activation. Moreover, both the microstructure and the allotropic ratio of the products, as well as the reaction path, are affected by mechanical activation.

### [26] INERTIZATION OF PYRITE CINDERS AND CO-INERTIZATION WITH ELECTRIC ARC FURNACE FLUE DUSTS BY PYROCONSOLIDATION AT SOLID STATE

Vinals J. Balart MJ. Roca A. - Waste Management. 22(7):773-782, 2002.

The viability of a pyroconsolidation process to render pyrite cinders inert and to co-inert pyrite cinders with a hazardous polymetallic residue such as electric arc furnace flue dusts (EAF) containing Pb, Cu, Zn, As, Cr, Ni and Mo were investigated. The effects of pyroconsolidation temperature (800-1200degreesC), milling pyrite cinders and additions of both CaO and EAF on the resulting microstructure of the pellets were determined. The microstructural changes were then compared with the results of the standard leaching tests. Full inertization of pyrite cinders was achieved after milling to  $<100 \mu\text{m}$  followed by a pelletization and pyroconsolidation process at a temperature of  $1200^\circ\text{C}$ . This process also allows co-inertization of pyrite cinders with controlled additions of EAF (up to  $\approx 10\%$ ). Following pyroconsolidation at  $1200^\circ\text{C}$ , the metallic elements were inert components in the four main phases: traces of Cr in hematite; Cr, Cu, Zn and Ni in spinel-phase; traces of Cr and Zn in calcium ferrites; and Pb and traces of Cu, Zn and Ba in K-Ca-Al-Fe glassy silicate

### [25] COMPOSED PHASES AND MICROHARDNESS OF ALUMINIUM-RICH ALUMINIUM-IRON ALLOYS OBTAINED BY RAPID QUENCHING, MECHANICAL ALLOYING AND HIGH PRESSURE TORSION DEFORMATION



Kaloshkin SD. Tcherdyntsev VV. Tomilin IA. Gunderov DV. Stolyarov VV. Baldokhin YV. Brodova IG. Shelekhov EV. - Materials Transactions. 43(8):2031-2038, 2002

Aluminium-based Al-Fe alloys with Fe content of 2, 4, 5, 8 and 11 mass% were examined using X-ray diffraction and Mossbauer spectroscopy. The alloys were prepared by various techniques: remelting, accelerated cooling by centrifugal casting, rapid quenching from the melt at a rate of 10(6) K/s, and mechanical alloying of pure elements in high-energy planetary ball mill. It is shown that the crystalline structure refinement and the composed phases of the alloys essentially depend on the techniques used for the sample preparation. Phase transformations by severe plastic torsion deformation of the alloys prepared by various techniques were studied. The highest supersaturation of Fe in the aluminium-based solid solution can be reached using two subsequent techniques of alloy treatment: rapid quenching and high-pressure torsion.

**[24] AMORPHOUS PHASE AND COMPACT SOLID FORMATION OF TI-(37.5-X) AT % SI-X AT % FE (X=0-10) POWDERS BY MECHANICAL ALLOYING AND PULSE CURRENT SINTERING**

Matsumoto A. Kobayashi K. Nishio T. Ozaki K. - Materials Transactions. 43(8):2039-2043, 2002

Ti-(37.5 - X) at%Si-X at%Fe (X = 0-10) powder mixtures have been mechanically alloyed in a planetary ball mill under an argon atmosphere for 180 ks. The milled alloy powders become amorphous and crystallization temperature is 843 K for X = 5, being 90 K higher than that for X = 0. Milled powders have been consolidated using a pulse current sintering process under 1.5 GPa. The porosity of an amorphous compact solid consolidated at 813 K is estimated to be 7.5% for X = 5, being much lower than 24% for X = 0. Fe addition to Ti-37.5 at%Si powder mixtures in mechanical alloying improves the stability of an amorphous phase and forming-ability of compact solid powders.

**[23] HYDROGENATION OF BODY-CENTERED-CUBIC TITANIUM-CHROMIUM ALLOYS PREPARED BY MECHANICAL GRINDING**

Takeichi N. Takeshita HT. Oishi T. Kaneko T. Tanaka H. Kiyobayashi T. Kuriyama N. - Materials Transactions. 43(8):2161-2164, 2002

The C15 and C14 intermetallic TiCr<sub>2-x</sub> (x = 0, 0.2 and 0.5) compounds were subjected to grinding in a high-energy ball mill. The X-ray diffraction profiles showed that the crystal structure transformed from C 15 and C 14 to bcc after mechanical grinding for 57.6 ks. The hydrogenation properties of the TiCr<sub>2-x</sub> (X = 0, 0.2 and 0.5) samples were examined by differential thermal analysis and pressure-composition isotherm measurements. The sample reacted with hydrogen at 5 MPa and 523 K by maintaining the bcc structure. An higher hydrogen content was observed for the sample with the higher Ti content. The maximum hydrogen content of TiCr<sub>2.0</sub>, TiCr<sub>1.8</sub> and TiCr<sub>1.5</sub> was found to be about 0.32, 0.36 and 0.47 H/M at 313 K, respectively, at 8 MPa

**[22] HYDROGEN PRESSURE-COMPOSITION ISOTHERMS FOR Ti45Zr38Ni17 AMORPHOUS AND QUASICRYSTAL POWDERS PRODUCED BY MECHANICAL ALLOYING**

Takasaki A. Huett VT. Kelton KF. - Materials Transactions. 43(8):2165-2168, 2002

Pressure-composition isotherms (PCTs) for amorphous and icosahedral (i) quasicrystal powders produced by mechanical alloying of Ti<sub>45</sub>Zr<sub>38</sub>Ni<sub>17</sub> powder mixtures were measured at temperatures of 473K and 523K at low-hydrogen pressures, lower than 0.1 MPa. Sloping plateau-like features on PCTs were observed at equilibrium hydrogen pressures lower than 1kPa, below an H/M (hydrogen to metal atom ratio) approximate to 1.2 and approximate to 1 for the amorphous and i-phase powders respectively. The plateau-like region for the i-phase powder was steeper and narrower than that for the amorphous powder, implying some small differences between the local structures of the i-phase and the amorphous phase. After the PCT measurements, an increase in the nearest-neighbor atom spacing and an expansion of the quasilattice were observed for the amorphous and i-phase powders respectively. Impurities from some unsynthesized elemental material and a Ti<sub>2</sub>Ni type phase were also present. These also absorbed hydrogen, shown by an expansion of their crystal lattices. However, no crystal hydride formation was observed in any of the powders

**[21] CHEMICAL AND MORPHOLOGICAL CHANGES OF MILLERITE BY MECHANICAL ACTIVATION**

Mulak W. Balaz P. Chojnacka M. - International Journal of Mineral Processing. 66(1-4):233-240, 2002

The chemical and morphological changes induced on the surface of millerite by mechanical activation have been studied by means of X-ray diffraction, electron microprobe, scanning electron microscopy and infrared spectra. Leaching tests in water, dilute nitric and hydrochloric acids have been carried out. The mechanical activation of millerite grains due to their disintegration is accompanied by an increase in the number of particles and generation of fresh previously unexposed surface. The agglomeration of grains and a partial oxidation of sulphide to sulphate ions were observed. The increase in leachability of the activated millerite may well be due to the combination of mechanically induced structural defects and chemical modification of millerite surface

**[20] MICROSTRUCTURE EVOLUTION AND THERMAL PROPERTIES IN NANOCRYSTALLINE CU DURING MECHANICAL ATTRITION**

Zhao YH. Lu K. Zhang K. - Physical Review B. 6608(8):5404, 2002

The microstructural evolution and thermal properties of nanocrystalline (nc) Cu during mechanical attrition were investigated by using quantitative x-ray-diffraction and thermal analysis techniques. Upon milling of the Cu powders with coarse grains, the grain sizes are found to decrease gradually with the milling time, and remain unchanged at a steady-state value (about 11 nm) with continued milling. The microstrain and the stored enthalpy increase to maximum values during the grain refinement, and decrease then increase to the second maxima and decrease again within the milling stage of steady-state grain size, while the lattice parameter remains unchanged during the entire milling process. The grain boundary (GB) enthalpy of the nc Cu was estimated, showing a GB softening-hardening-softening cyclic variation within the steady-state



milling. The present work indicated with clear experimental evidence that even within the milling stage of steady-state grain size, the microstructure (both the GB's and the crystallites) of nc materials is still changing, which may result from the GB sliding.

**[19] HIGH-TEMPERATURE MAGNETIC PROPERTIES OF SMCO<sub>6.7</sub>-XCu<sub>0.6</sub>Ti<sub>x</sub> MAGNETS**

Al-Omari IA. Shobaki J. Skomski R. Leslie-Pelecky D. Zhou J. Sellmyer DJ. - *Physica B*. 321(1-4):107-111, 2002

Magnetic properties of SmCo<sub>6.7-x</sub>Cu<sub>0.6</sub>Ti<sub>x</sub> Magnets (x = 0.25 and 0.30) are studied as a function of milling time and temperature. The samples were prepared by two methods: first by arc-melting and milling, and second by mechanical alloying from powders and subsequent annealing. The X-ray diffraction analyses show that the samples consist of 1:5 and 2:17 phases. Magnetic measurements show that the coercivity for samples prepared by arc-melting and milling increases with increase in milling time and it reaches a maximum of 8.1 kOe for x = 0.30 and 5.3 kOe for x = 0.25, and then decreases for both samples. The coercivities for the sample with x = 0.30 are higher than the coercivities for the sample with x = 0.25 for all milling times. High-temperature vibrating sample magnetometer magnetic measurements show that the coercivity for all samples decreases with increasing temperature from room temperature to 600degreesC. The sample prepared by mechanical alloying has higher coercivity (20 kOe. at room temperature) than that prepared by arc-melting and milling for all temperatures under investigation. These materials have moderate energy products (1-10 MG Oe) and can be used for high-temperature magnetic applications

**[18] NEW ROUTE FOR THE EXTRACTION OF CRUDE ZIRCONIA FROM ZIRCON**

Welham NJ. - *Journal of the American Ceramic Society*. 85(9):2217-2221, 2002

A commercial grade of zircon (ZrSiO<sub>4</sub>) concentrate was mechanically milled with MgO for up to 100 h in a laboratory-scale mill. The resultant powders were subjected to thermal processing, chemical leaching, and X-ray diffraction (XRD). There was no direct evidence of reaction during the milling step, with no new phases evident from XRD. Leaching of the powder showed that a reaction had occurred, and increased solubility with milling time was attributed to the formation of a nanostructured Mg-Zr-Si oxide, which dissolved congruently. Heating the powders resulted in a number of thermal events, including the formation/crystallization of ZrO<sub>2</sub> and Mg<sub>2</sub>SiO<sub>4</sub>. Thermal treatment of the milled powders allowed selective chemical leaching of the magnesium, and silicon, leaving a powder containing similar to 90% ZrO<sub>2</sub>

**[17] MECHANICALLY INDUCED SOLID-STATE REACTION FOR SYNTHESIZING GLASSY CO<sub>75</sub>Ti<sub>25</sub> SOFT MAGNET ALLOY POWDERS WITH A WIDE SUPERCOOLED LIQUID REGION**

El-Eskandarany MS. Zhang W. Inoue A. - *Journal of Materials Research*. 17(9):2447-2456, 2002

A single phase of glassy Co<sub>75</sub>Ti<sub>25</sub> alloy powders was synthesized by high-energy ball milling the elemental powders at room temperature, using the mechanical alloying method. The final product of the glassy alloy, which is obtained after ball milling for 86 ks, exhibits soft magnetic properties with polarization and coercivity values of 0.67 T and 2.98 kA/m, respectively. This binary glassy alloy, in which its glass transition temperature (T-g) lies at a rather high temperature (833 K), transforms into face-centered-cubic Co<sub>3</sub>Ti (ordered phase) at 889 K through a single sharp exothermic reaction with an enthalpy change of crystallization (DeltaH(x)) of -2.35 kJ/mol. The supercooled liquid region before crystallization DeltaT(x) of the synthesized glassy powders shows an extraordinary high value (56 K) for a metallic binary system. The reduced glass transition temperature [ratio between T-g and liquidus temperatures, T-1 (T-g/T-1)] was 0.56. We also demonstrated postannealing experiments of the mechanically deformed Co/Ti multilayered composite powders. The results show that annealing of the powders at 710 K leads to the formation of a glassy phase (thermally enhanced glass formation reaction). Its heat formation was measured directly and found to be -0.56 kJ/mol. The similarity in the crystallization and magnetization behaviors between the two classes of as-annealed and as-mechanically alloyed glassy powders implies the formation of the same glassy phase

**[16] AN INVESTIGATION ON THE TRANSFORMATION OF THE DECAGONAL PHASE TO A B2 PHASE IN AL-CU-CO ALLOY DURING MECHANICAL MILLING**

Mukhopadhyay NK. Murthy GVS. Murty BS. Weatherly GC. - *Journal of Alloys & Compounds*. 342(1-2):38-41, 2002

Al<sub>65</sub>Cu<sub>20</sub>Co<sub>15</sub> decagonal phase, synthesized by a slow cooling technique, were mechanically milled in a high energy planetary ball mill for 10, 20 and 30 h. X-ray diffraction, scanning electron microscopy and transmission electron microscopy techniques were used for characterization of phases. The phase transformation from the decagonal phase to a B2-crystalline phase (ordered CsCl type phase) during mechanical milling is reported here for the first time. Powders milled for more than 10 h contained predominantly the B2 type crystalline phase with a lattice parameter of 0.29 nm. This crystalline phase was found to be quite stable after 30 h of milling and also on subsequent annealing at 600 degreesC. These experimental results lend support to an earlier suggestion that the decagonal phase in Al-Cu-Co is actually less stable than the B2 phase at low temperatures

**[15] PB(Fe<sub>2</sub>/3W<sub>1</sub>/3)O-3 BY MECHANICAL ACTIVATION OF COPRECIPITATED PB<sub>3</sub>Fe<sub>2</sub>O<sub>6</sub> AND WO<sub>3</sub>**

Khim AS. Xue JM. Wang J. - *Journal of Alloys & Compounds*. 343(1-2):156-163, 2002

Single phase Pb(Fe<sub>2</sub>/3W<sub>1</sub>/3)O-3 (PFW) of perovskite structure was synthesized by mechanically activating a mixture of coprecipitated Pb<sub>3</sub>Fe<sub>2</sub>O<sub>6</sub> and WO<sub>3</sub> at room temperature for 5 h. Five hours of mechanical activation led to PFW particles of 20-30 nm in size with a rounded particle morphology. The perovskite PFW phase derived from mechanical activation is stable against rising temperature and remains as the main crystalline phase up to the sintering temperature of 870degreesC. The sintered density of PFW thus derived increases with increasing activation time and sintering temperature. A maximum sintered density of 98.5% theoretical density is obtained when the activation-derived PFW powder is sintered at



870degreesC. It exhibits a maximum dielectric permittivity of similar to 9000 and a Curie temperature of similar to 97degreesC when measured at 10 kHz.

**[14] INFLUENCE OF CARBON ON THE ELECTRODE CHARACTERISTICS OF MGNI PREPARED BY MECHANICAL ALLOYING**

Ruggeri S. Roue L. Liang GX. Huot J. Schulz R. - Journal of Alloys & Compounds. 343(1-2):170-178, 2002

The influence of carbon addition on the characteristics of MgNi alloy prepared by mechanical alloying and used as metal hydride electrode has been studied. Our results indicate that, despite its low proportion, carbon addition has a major deleterious effect on the electrode performance, i.e. the initial discharge capacity decreases exponentially from 522 to 332 mA h g(-1) with carbon content increasing from 0 to 3.5 wt.%. This exponential decay cannot be only explained by a decrease in the H solubility due to the dissolution of C atoms in the hydrogen interstitial sites. The cycle life of the electrode is not influenced by the carbon content. The particle morphology and the amorphous structure of the material are unmodified by the carbon addition. In addition, our results indicate that the hydrogen diffusivity in MgNi is unchanged by carbon addition ( $D-H/a(2)=3.2 \times 10^{-5} \text{ s}^{-1}$ ). In contrast, the exchange current density  $I_0$  decreases from 92 to 62 mA g(-1) with increasing carbon content in the alloy. This results indicate that carbon limits the charge-transfer reaction at the surface of the alloy, which must have an influence on the initial discharge capacity of the alloy. In addition, the electrochemical PCT curves reveal that the slopes of the isotherms become steep with C addition indicating a wider distribution of energy levels for hydrogen. This is considered as the major reason for the observed decrease in the initial discharge capacity of the MgNiCx alloys with increasing x.

**[13] EFFECTS OF MILLING INTENSITY ON AMORPHISATION OF AL-FE MIXED POWDERS BY MECHANICAL ALLOYING**

Zou Y. Saji S. Kusabiraki K. - Materials Science & Technology. 18(8):897-900, 2002

The effects of milling intensity on the amorphisation of Al - Fe powder mixtures containing 10, 15, 20, and 25 at.-% Fe, during mechanical alloying by a high energy planetary ball mill, have been investigated. Two levels of milling intensity, 80g and 150g (where g is acceleration due to gravity), were adopted. Two different pathways of amorphisation reaction were found; Al - Fe solid solution-->amorphous phase; and Al - Fe solid solution-->formation of Al5Fe2 phase-->amorphous phase. The former reaction was observed in Al - 10, - 15, - 20, and - 25 at.-%Fe compositions at the lower milling intensity and in Al - 10 at.-%Fe at the higher milling intensity. The latter reaction was observed in Al - 15, - 20, and - 25 at.-%Fe compositions at the higher milling intensity. The two pathways of amorphisation reaction are explained mainly by a kinetics approach.

**[12] PHASE AND MICROSTRUCTURAL EVOLUTION DURING HEATING OF MECHANICALLY MILLED AL/V2O5 COMPOSITE POWDERS**

Zhang DL. Adam G. Langdon AG. - Materials Science & Technology. 18(8):901-907, 2002

The reactions between V2O5 and aluminium during heating of high energy ball milled powders have been studied using a combination of thermal analysis and various microstructural characterisation techniques. High energy ball milling results in the formation of Al/V2O5 Composite powder particles. With a coarse composite structure of the powder particles, the reaction between aluminium and V2O5 phases occurs in two steps during heating. The low temperature step starts at similar to 540degreesC and causes the formation of unknown phases, while the high temperature step starts at similar to 795degreesC and causes the formation of Al3V and alpha-Al2O3. When the composite structure of the powder particles is sufficiently refined, the two step reaction is changed into a one step reaction which starts at 520degreesC. The one step reaction causes the formation of Al3V, gamma-Al2O3 and other unknown phases. When the powders are heated to above 1000degreesC, gamma-Al2O3 is transformed into alpha-Al2O3, and the unknown phases are converted into Al3V and alpha-Al2O3, leading to the formation of new composite powder particles with a microstructure consisting of fine Al2O3 particles embedded in a matrix of Al3V.

**[11] ELECTROCHEMICAL PROPERTIES AND INTERFACIAL STABILITY OF (PEO)(10)LICF3SO3-TiNO2N-1 COMPOSITE POLYMER ELECTROLYTES FOR LITHIUM/SULFUR BATTERY**

Shin JH. Kim KW. Ahn HJ. Ahn JH. - Materials Science & Engineering B-Solid State Materials for Advanced Technology. 95(2):148-156, 2002

Electrochemical properties and interfacial stability of (PEO)(10)LiCF3SO3 composite polymer electrolytes (CPEs) with titanium oxide (TinO2n-1, n = 1, 2) prepared by ball milling as ceramic filler are presented. The amount of titanium oxide powders introduced was between 5 and 15 wt.% into the (PEO)(10)LiCF3SO3 polymer electrolyte. The addition of titanium oxide which consisted of plate-like spherical shape ranging from sub-micron to several microns increases the ionic conductivity by an order of magnitude compared with (PEO)(10)LiCF3SO3 polymer electrolyte without titanium oxide, and also have the higher ionic conductivity at low temperature. Li/CPEs/50% S cells have a initial discharge capacity of between 1400 and 1600 mA h g(-1)-sulfur with current rate of 100 mA g(-1)-sulfur at 90 degreesC and show the higher initial charge/discharge performance than without titanium oxide. The interfacial stability was remarkably improved by the addition of titanium oxide into the (PEO)(10)LiCF3SO3 polymer electrolyte.

**[10] RELATION BETWEEN MAGNETISM AND ATOMIC VOLUME OF FCC SOLID SOLUTION OF FE-CU-AU AND FE-CU-NI ALLOYS PREPARED BY MECHANICAL ALLOYING [JAPANESE]**

Kincho M. Ino H. Oda K. Tokumitsu K. - Journal of the Japan Institute of Metals. 66(8):816-823, 2002

The aim of this study is to examine the relation between the stability of ferromagnetism and the atomic volume of FCC Fe-Cu-Au and Fe-Cu-Ni alloys prepared by mechanical alloying. From the measurements of X-ray diffraction, magnetization



and Mossbauer effect, we concluded that the ferromagnetism of the FCC iron alloys is stabilized with increasing atomic volume of the alloys. The magnetic moment of iron increases with increasing atomic volume of the alloy up to 2.7,  $\mu(B)$ . The trend is well consistent with that of the result of recent band calculation for FCC iron, which suggests that the local state density of iron in Fe-Cu-Au alloys is close to that of pure iron.

**[9] BINDERLESS FIBERBOARD FROM STEAM EXPLODED MISCANTHUS SINENSIS: THE EFFECT OF A GRINDING PROCESS**

Velasquez JA. Ferrando F. Salvado J. - Holz Als Roh-und Werkstoff. 60(4):297-302, 2002

Miscanthus sinensis was thermomechanically pretreated and used to produce fiberboard with no synthetic binders. The lignocellulosic material was steam exploded using an aqueous vapor process in a batch reactor. Part of the resultant pulp was ground to pass through a 4-mm sieve. The effect of the grinding on the physicochemical responses of the fiberboard was evaluated. ANOVA methodology was used. The boards obtained with the ground pulp were of better quality than those obtained with the non-ground pulp. The milling process considerably improved the internal bond strength and diminished the density of the board. The other measured properties (MOE, MOR, WA and TS) were not significantly affected by the process. Scanning electron micrographs show that the changes are due to the segregation of packages of fibers and not to the cut of the fibers. This segregation increases the inter-fiber bonding area.

**[8] COARSENING KINETICS AT 600 DEGREES C OF AL<sub>2</sub>O<sub>3</sub> DISPERSOIDS IN A MECHANICALLY ALLOYED ALUMINIUM ALLOY**

Barlow IC. Jones H. Rainforth WM. - Scripta Materialia. 47(5):331-335, 2002

The coarsening parameter  $K = (r(3) - r(0)^3)/t$  has been measured for Al<sub>2</sub>O<sub>3</sub> in Al-9Ti-6O-1Mg-0.35Li-1.25C (wt.%) at 600 degreesC for comparison with measurements for Al<sub>4</sub>C<sub>3</sub>, Al<sub>3</sub>Ti, Al<sub>13</sub>Fe<sub>4</sub>, Al-12(Fe,V)(3)Si and Al<sub>3</sub>Ni in aluminium-based matrices at 600 degreesC. Measured values of K follow the same sequence as theoretical values, but observed values are typically an order of magnitude smaller than calculated values assuming that one 'unit' of the coarsening phase is added each time an atom of the slowest diffusing, least soluble, solute becomes attached.

**[7] SECONDARY RECRYSTALLIZATION AND HIGH TEMPERATURE COMPRESSIVE PROPERTIES OF ODS MA NiAl**

Ur SC. Nash P. - Scripta Materialia. 47(6):405-409, 2002

A NiAl based oxide dispersion strengthened alloy has been produced by mechanical alloying and consolidated by hot extrusion. Thermo-mechanical treatments have been performed to induce secondary recrystallization (SRx). SRx leads to a pronounced grain coarsening without concurrent dispersoid coarsening, resulting in improved high temperature mechanical properties

**[6] AMORPHIZATION BY MECHANICAL ALLOYING IN METALLIC SYSTEMS WITH POSITIVE GIBBS ENERGY OF FORMATION**

Bai HY. Michaelsen C. Gente C. Bormann R. - Physical Review B. 6605(5):9902, 2002

**[5] ELECTROCHEMICAL PROPERTIES AND INTERFACIAL STABILITY OF (PEO)(10)LiCF<sub>3</sub>SO<sub>3</sub>-TiO<sub>2</sub>n-1 COMPOSITE POLYMER ELECTROLYTES FOR LITHIUM/SULFUR BATTERY**

Shin JH. Kim KW. Ahn HJ. Ahn JH. - Materials Science & Engineering B-Solid State Materials for Advanced Technology. 95(2):148-156,

Electrochemical properties and interfacial stability of (PEO)(10)LiCF<sub>3</sub>SO<sub>3</sub> composite polymer electrolytes (CPEs) with titanium oxide (TiO<sub>2</sub>n-1, n = 1, 2) prepared by ball milling as ceramic filler are presented. The amount of titanium oxide powders introduced was between 5 and 15 wt.% into the (PEO)(10)LiCF<sub>3</sub>SO<sub>3</sub> polymer electrolyte. The addition of titanium oxide which consisted of plate-like spherical shape ranging from sub-micron to several microns increases the ionic conductivity by an order of magnitude compared with (PEO)(10)LiCF<sub>3</sub>SO<sub>3</sub> polymer electrolyte without titanium oxide, and also have the higher ionic conductivity at low temperature. Li/CPEs/50% S cells have a initial discharge capacity of between 1400 and 1600 mA h g(-1)-sulfur with current rate of 100 mA g(-1)-sulfur at 90 degreesC and show the higher initial charge/discharge performance than without titanium oxide. The interfacial stability was remarkably improved by the addition of titanium oxide into the (PEO)(10)LiCF<sub>3</sub>SO<sub>3</sub> polymer electrolyte

**[4] MECHANOCHEMICAL ACTIVATION OF SOLID SALTS K<sub>2</sub>PtX<sub>6</sub> (X =Cl, BR)**

Mitchenko SA. Khomutov EV. Kovalenko VV. Beletskaya IP. - Kinetics & Catalysis. 43(4):469-474, 2002

Mechanochemical treatment of solid-phase K<sub>2</sub>PtX<sub>6</sub> salts in a vibrating mill in an argon or air atmosphere produced paramagnetic Pt(III) complexes via the homolytic cleavage of the Pt-X bond. Lewis acid sites were found on the surface of the mechanically activated K<sub>2</sub>PtCl<sub>6</sub> salt using the paramagnetic probe method. The sites can be attributed to coordinatively unsaturated Pt(IV) complexes formed via Pt-Cl bond heterolysis

**[3] FORMATION AND DECOMPOSITION OF THE METHYLPLATINUM(IV) COMPLEX IN THE MECHANICALLY ACTIVATED K<sub>2</sub>PtCl<sub>4</sub> POWDER-MEI VAPOR SYSTEM**

Mitchenko SA. Khomutov EV. Zhikharev IV. Beletskaya IP - Kinetics & Catalysis. 43(4):475-483, 2002

Mechanical treatment of the K<sub>2</sub>PtCl<sub>4</sub> solid salt in a vibrating mill results in Pt-Cl bond heterolysis to form coordinatively unsaturated Pt(II) complexes. At room temperature, the freshly treated K<sub>2</sub>PtCl<sub>4</sub> salt absorbs methyl bromide and evolves methyl chloride to the gas phase. The reaction mechanism involves the following sequence of steps: the oxidative addition of methyl iodide to Pt(II) with the intermediate formation of Pt(IV) methyl complexes and the decomposition of the latter due to intramolecular reductive elimination with methyl chloride formation. The first step of the reaction of MeI with the preactivated surface of the K<sub>2</sub>PtCl<sub>4</sub> salt is assisted by active sites, which are regenerated in each act of the chemical transformation of MeI into MeCl involving in the chain substitution of halogen in methyl iodide. The coordinatively



unsaturated surface platinum complexes can act as such active sites. Due to their effective positive charge, they can provide electrophilic assistance to nucleophilic substitution. Chain termination is probably due to the coordination of the complex with a coordination vacancy and an interstitial chloride ion to the inactive  $K_2PtCl_4$  complex

**[2] APPLICATION OF MECHANOCHEMICAL CATALYSIS TO THE SYNTHESIS OF BORIC ACID ESTERS**

Molchanov VV. Goidin VV. Golovin AV. Zolotovskaya YB. Bogdanov SV. Volodin AM. - *Kinetics & Catalysis*. 43(4):536-541, 2002

The syntheses of triisopropyl borate and other boric acid esters under conditions of mechanochemical activation with the use of zeolite catalysts were found to be highly efficient. The proposed method exhibits the following advantages over known methods: short synthesis times, low energy consumption, higher yields of target products, and the absence of byproducts. The mechanism of the catalytic esterification of boric acid under conditions of mechanochemical activation is discussed

**[1] STUDY OF FLUORITE PHASES IN THE SYSTEM  $Bi_2O_3-Nb_2O_5-Ta_2O_5$ . SYNTHESIS BY MECHANOCHEMICAL ACTIVATION ASSISTED METHODS**

Castro A. Palem D. - *Journal of Materials Chemistry*. 12(9):2774-2780, 2002.

Mechanochemical activation followed by annealing at moderate temperatures results in the stabilisation, at room temperature, of different fluorite-type phases, belonging to the  $Bi_2O_3-Nb_2O_5$ ,  $Bi_2O_3-Ta_2O_5$  and  $Bi_2O_3-Nb_2O_5-Ta_2O_5$  systems. The results obtained from different starting compositions and mechanical activation devices (vibrating and planetary ball mills) were compared with those obtained by classical solid-state synthesis methods. Vibrating ball mill activation yields amorphous precursors, which permits one to obtain fluorites with increasing pentavalent cation content when the annealing temperature is further increased. Planetary ball milling leads to the apparent mechanochemical synthesis of a fluorite phase at room temperature. The products were studied by X-ray powder diffraction at room temperature and above, thermal analysis techniques and transmission electron microscopy. Moreover, impedance spectroscopy measurements carried out on  $Bi_3MO_7$  ( $M = Nb, Ta$ ) fluorites, obtained by a mechanochemically assisted method, showed that these materials are good ionic conductors, with conductivities at 600 degreesC of  $5 \times 10^{-4} S cm^{-1}$  or higher, the processing history of the materials having a great influence on their properties



Correspondants du Réseau Français de Mécanosynthèse  
188 Laboratoires ou Groupes de Recherche (34 Pays)  
Bureau : E. Gaffet (Président), G. Le Caër (Secrétaire Général), A.R. Yavari (Trésorier)

<b>Algérie (1)</b> .....	<b>Pologne (3)</b> .....
<b>Allemagne (7)</b> .....	<b>Portugal (1)</b> .....
<b>Angleterre (4)</b> .....	<b>Roumanie (2)</b> .....
<b>Argentine (3)</b> .....	<b>Russie (8)</b> .....
<b>Australie (8)</b> .....	<b>Singapour (3)</b> .....
<b>Belgique (1)</b> .....	<b>Slovaquie (3)</b> .....
<b>Brésil (5)</b> .....	<b>Suède (3)</b> .....
<b>Bulgarie (1)</b> .....	<b>Tunisie (1)</b> .....
<b>Canada (8)</b> .....	<b>U.S.A.(8)</b> .....
<b>Chine (7)</b> .....	<b>Viet Nam (2)</b> .....
<b>Corée du Sud (4)</b> .....	<b>Yougoslavie (2)</b> .....
<b>Croatie (3)</b> .....	<b>France</b> .....
<b>Danemark (1)</b> .....	
<b>Egypte</b> .....	
<b>Espagne (2)</b> .....	
<b>Grèce (1)</b> .....	
<b>Hongrie (3)</b> .....	
<b>Inde (2)</b> .....	
<b>Israël (4)</b> .....	
<b>Italie (8)</b> .....	
<b>Japon (11)</b> .....	



<b>Nouvelle - Zélande (1)</b>	
-------------------------------	--

