RESEAU FRANCAIS DE MECANOSYNTHESE
Lettre N°39

Juin 1998

116 (+2) Groupes de Recherches (dont 50 (+1) à l'étranger)
167 (+10) Correspondants
Bureau : E. Gaffet (Président), G. Le Caër (Secrétaire Général), A.R. Yavari (Trésorier)

10 Nouvelles Adhésions

D. Basset - M.B.N. srl - San Vendemiano - Italie
T. Girot - LSG2M - CNRS - Nancy - France
C. Goujon - Ecole des Mines - St Etienne - France
F. Goutenoire - Lab. Fluorures - Le Mans - France
P. Lacorre - Lab. Fluorures - Le Mans - France
F.J. Lincoln - Univ. Western Australia - SRCAMMP - Australie
N. Lorrain - SRMP - CEA - Saclay - France
J. Nikolov - Australian National University - Canberra - Australie
P. Retoux - Lab. Fluorures - Le Mans - France
M. Zouggar - SP2MI - Univ. Poitiers - France

==

Annonce !!
Les 4th Journées du Réseau Français de Mécanosynthèse :

les JRFM'99
seront organisées à Dijon (Mai - Juin 1999)
par l'Equipe "Matériaux à Grains Fins", dirigée par Prof. J.-C. Niepce,
du Laboratoire de Recherche sur la Réactivité des Solides
UMR 5613 CNRS - Université de Bourgogne

Le thème retenu pour les JRFM'99 sera
"Mécanique et Réactivité Chimique"

Les JRFM'98 se sont déroulées les 12 et 13 Mai 1998,
et ont réuni une cinquantaine de participants sur le thème
"Propriétés Physiques et Chimiques des Matériaux Nanostructurés"
4 conférences invitées, 8 communications orales et 13 posters ont été présentés
lors de ces journées au Mans
Les résumés de ces différentes contributions sont accessibles
sur le site Web des JRFM98

==

ANNONCE DE CONGRES ET / OU ECOLES
CONGRESS AND SCHOOL ANNOUNCEMENTS

==

All the details may be obtained by E_Mail to E. Gaffet

3rd Pacific RIM International Conference on
Advanced Materials and Processing
Honolulu - Hawaï - 12 - 16 Juin 1998
Contact : M. Imam - Naval Research Lab. Washington - E_Mail Imam@anvil.nrl.navy.mil
et R. DeNale NSWC - E_Mail : DeNale@Oasys.dt.Navy.mil

NANO'98
Stockholm - Suède - 14 - 19 Juin 1998
Secrétariat Cof. : nano98@kth.se

Advanced Nanomaterials from Vapor (ANfV'98)
Uppsala - Suède (Satellite Meeting to NANO'98) - 17 Juin 1998
Contact : L. Kiss - Uppsala University /**E_Mail :** Laszlo.Kiss@Material.uu.se

----

CIMTEC'98 - World Ceramics Congress and Forum on New Materials
Florence - 14 - 19 Juin 1998
Web Site : http://www.dinamica.it/cimtec98/

3rd International Symposium on Metallic Multilayers (MML'98)
Vancouver - 14 - 19 Juin 1998
Contact : E_MAil : Conference_Service@SFU.CA

E_MRS 1998 - Spring Meeting
Strasbourg - France - 16 - 19 Juin 1998
E_Mail : emrs@phase.c-strasbourg.fr

"High Temperature Nanostructured Materials" Session
High Temperature Materials, Processing and Diagnostics Gordon Conference
New Hampshire - 19 - 24 Juin 1998
Contact : J. Gole - Georgia Institute of Technology E_Mail : PH294jg@prism.gatech.edu
et N. Jacobson E_Mail Nathan.S.Jacobson@lerc.Nasa.gov

41ème Colloque de Métallurgie de l'INSTN
"Ségrégation Interfaciale dans les Solides
Saclay - France - 23 - 25 Juin 1997
Contact : J. Pugnetti - Secrétariat 41 ème Colloque INSTN
CEA Saclay - INSTN - 91191 - Gif sur Yvette Cedex - Fax : +33 - (0) 1 - 69 08 97 77

4th Russian Conference on the
Physics and Chemistry of Ultra Dispersed Systems"
Obninsk - Russie - 29 Juin 3 Juillet
Contact : P.N. Martynov E_Mail : Sta@ippe.rssi.ru

Journées Francophones des Jeunes Physico-Chimistes
7-9 juillet 1998 - Montpellier
La 4e édition de ces journées multidisciplinaires propose aux étudiants et jeunes chercheurs un lieu de rencontre et d'échange autour de la Physico-Chimie. Trois grands thèmes seront abordés: - Biologie, Santé, Environnement;
- Matière, Matériaux;
- Réactivité, Surfaces, Interfaces.

Chaque thème sera introduit par une personnalité scientifique, développé par une série de communications orales et complété par une séance de communications par affiche.
Responsables: Josette Olivier-Fourcade, Jean-Claude Jumas, Pierre-Emmanuel Lippens
Renseignements: Pierre-Emmanuel Lippens
Laboratoire de Physicochimie de la Matière Condensée UMR5617 Université Montpellier II - CC003 34095 Montpellier Cedex 05
Tél.: 04 67 14 45 48 / Fax: 04 67 14 42 90 / E-mail : jfjpc@crit.univ-montp2.fr
Internet : http://ubik.crbm.cnrs-mop.fr/jfjpc98/jfjpc-98.html

----

High Temperature Nanostructured Materials
Gordon Conference - New Hampshire - USA - 19 - 24 Juillet 1998
Contact : Nanthan.S.Jacobson@lerc.nasa.gov

EuroMAt'98
Lisbonne - Portugal - 22 - 24 Juillet 1998
E_Mail : lfspm@lemac.ist.utl.pt

Intelligent Processing of Nanostructured Ceramics
Materials Science Summer Institute - New Brunswick - 20 - 29 Août 1998
Contact : L.C. Klein Rutgers University - E_Mail ; Licklein@RCI.Rutgers.Edu

----

6èmes Journées de la Matière Condensée "JMC6" et 17th General Conference of the Condensed Matter Division of the European Physical Society "CMD17"

Grenoble - France - 25 - 29 Août 1998
Org : Société Française de Physique et European Physical Society
Website : http://www.polycnrs-gre.fr/eps.html

Fatigue Damage of Structural Materials II

Engineering Foundation Conference
Cape Cod - Massachusetts - USA 31 Août - 4 Septembre 1998
Org. A.K. Vasudevan, J.C. Cammett, T. Nicholas, K. Jata
E_Mail : engfnd@aol.com

ESTAC 7 et EUROSOLID - 5

Baltonfüred - 30 Août - 4 Septembre 1998
Contact : Prof. G. Liptay - Hungarian Chemical Society - Fö u. 68, Budapest - H - 1027 Hongrie

----

5th International Conference on Nanometer scale Science and Technology (NANO 5)

Birmingham - UK - 31 Aout - 4 Septembre 1998
Site : http:://www.iop.org/IOP/Confs/IVC

Ninth International Symposium on Small Particles and Inorganic Clusters (ISSPIC 9)

Lausanne - Suisse - 1 - 5 Septembre 1998
Website : http:://ipent.epfl.ch/isspic9

Magnetism of Nanostructured Phases - MNP Conference EMMA Satellite Meeting

San Sebastian (Espagne) - 4 / 6 Septembre 1998
E_Mail : wupdocal@sp.ehu.es

9th European Symposium on Comminution and Classification

Albi (France) - 8 - 10 Septembre 1998
sous l'égide de l'European Federation of Chemical Engineering
Contacts : J. Dodds - Chairman of the Organizing Committee

First Joint ESF - NSF Symposium on Aerosols for Nanostructured Materials and Device
Edinburgh - Ecosse - 12 Septembre 1998
Contact : h. Fissan@uni-duisburg.de ou dyhpui@tc.umn.edu

First International Conference on Inorganic Materials

Synthesis, Characterisation, Properties and Applications of Inorganic Materials
Versailles - 16 / 19 Septembre 1998 - France
Website : http://www.elsevier.nl/locate/materials98

ISAPM98

3rd International Symposium on Advanced Powder Materials (ISAPM98)
23 - 26 September 1998 - KAIST - Tazejong - Corée du Sud
Correspondence : Prof. Suk-Joong L. Kang or Ms. Sung Sook Park - Center for Interface Science and Engineering of Materials (CISEM) - Korea Advanced Institute of Science and Technology (KAIST) - Yusong-gu, Kusong-dong, Taejon, 305-701 Korea - Tel : 82-(0)42-869-4113, 8919 / Fax : 82-(0)42-869-8920
E-mail : sjkang@sorak.kaist.ac.kr / e_cisem@cais.kaist.ac.kr

Solid State Chemistry : Novel Syntheses and New Materials

Bordeaux - France - 24/26 Septembre 1998
Website : http:://chemistry.rsc.org/rsc/confs.htm

The Rehbinder Memorial International Conference on Colloïd Chemistry and Physical Chemical Mechanics
Moscou (Russie) - 4 - 8 Octobre 1998
Contact : Prof. N.B. Uriev - Institute of Physical Chemistry - Leninsky Prospect 31 - 11795 Moscow - Russie
E_Mail : Rehbinder98rehb.chem.msu.su ou http://www.chem.msu.su

----

Powder Metallurgy 98

Granada - Espagne - 18 - 22 Octobre 1998
Site Web : http://www.epma.com/congress/

NOUVEAU
NEW

Gorham / Intertech Conference on "Commercializing Nanotechnology 98 : Bridging New Materials to Market"

19 - 21 Octobre 1998 Nashville - TN USA
Contact : C.E. Spear - Intertech Corporation : Fax 207 - 781 - 2150

JA 98

Paris - 27 - 29 Octobre 1998
Symposium 1 : Phénomènes déterministes et aléatoires en science des matériaux
Symposium 2 : Matériaux poreux et mousses : élaboration, structures et propriétés
Symposium 3 : Les hydrures métalliques
Symposium 4 : Propriétés Thermophysiques et thermomécaniques des matériaux de la mesure à la simulation de procédés industriels
Symposium 5 : Analyse d'images et reconnaissance de formes en matériaux
Symposium 6 : Lois de comportement et calcul de structures
Org. SF2M - **Contact** : SFMM@wanadoo.fr

NOUVEAU
NEW

Fifth Internation Symposium on Quatum Confinement : Nanostructures
194th Meeting of the Electrochemical Society
1 - 6 Novembre 1998 - Boston - MA - USA
http : //www.electrochem.org

Symposium on Advanced Technologies for Particle Production

AIChE Annual Meeting
15 - 20 November - Miami Beach - Fl - USA
Technical Sessions and ChairPersonns

1/ Particle Synthesis in Dispersions and Supercritical Fluids-R. Davis/MT Harris/D. Tomasko
2/ Sol - Gel Synthesis of Particles - A McCormick/PN Kumta/T. Okubo
3/ Chemical Kinetics during Particle Formation - J. Floess, K. Higashitani, S. E. Pratsinis
4/ In-Situ Diagnostics during Particle Formation-Ph. W. Morrison,R.M. Carangelo, D.T. Spicer
5/ Agglomerate Particle Dynamics - G. Fotou, SK Friedlander, Takahashi
6/ Computational Fluid Dynamics during Particle Formation and Growth - L. Collins, K. Kontomaris
7/ Aerosol Reactors - A.W. Weimer, M. Kamal Akhtar
8/ Particle Charging - T. Matsoukas
9/ Film synthesis by Particle Technologies - G. Grader, S. Bhandarkar
10/ Nanoparticles - M. Senna, TJ Mountziaris, H. Glicksmn
11/ Particulate deposits : Transport mechanisms, microstructure and properties : D. Rosner
12/ Posters on Advanced Technologies for Particles Production : G. Beaucage, H. Riemenschneider

Web Site : www.aiche.org

ISMANAM98

International Symposium on Metastable, Mechanically Alloyed and Nanocrystalline Materials
Wollongong (Sydney) - Australie - 7 - 12 Décembre 1998
International Advisory Committee :
V.V. Boldyrev, R.W. Cahn, S. Enzo,H. Fecht, E. Gaffet, A. Garcia - Escorial, A.L. Greer, E.Y. Gutmanas, K. Lu, M. Mammoun, M.T. Mora, H. Mori, M.A. Morris, L. Schultz, M. Senna, A. Slawska - Waniewska, R. Schwarz, R.W. Siegel, M. Umemoto
ISMANAM Steering Committee:
J.H. Ahn, M.D. Baro, A. Calka, S. Gialanella, A. Inoue, G. Le Caer, D.G. Morris, P.H. Shingu, H. Bakker, R. Bormann, G. Cocco, A. Hernando, C.C Koch, M. Magini, R. Schulz, A.R. Yavari
Contact : A. Calka E_Mail : Andrzej_Calka@uow.edu.au et
WebSite : http:://www.uow.edu.au/conferences/ismanam98

Satellite Symposium on Mechanochemistry / ISMANAM98

(Mechanochemical Synthesis and Mechanochemistry)
Wollongong - Australie 7 /12 Decembre 1998
International Advisory Committee :
E. Ivanov (Chairman), A. Calka, V. Bodyrev, P. Butyagin,
E. Gaffet, E. Gutman, M. Senna, C. Suryanaryana, R. Schwarz
WebSite : http:://www.uow.edu.au/conferences/ismanam98

Nanostructured Hybrid Materials

Symposium TMS Annual Meeting - San Diego CA - USA - 28 Février 4 Mars 1999
Contact : gmchow@anvil.nrl.navy.mil

NOUVEAU
NEW

4th International Workshop on Metastable Phases (IV IWOMP)
7 - 9 Avril 1999 - Bologne - Italie
Contact : Bonetti@df.unibo.it

12th International Conference on Wear of Materials
Atlanta - Georgie / USA - 25 - 29 Avril 1999
contact : Amy Richardson E_Mail A.Richardson@elsevier.co.uk
or web site : http://www.elsevier.nl/locate/wom99

Nanostructured Materials Symposium at the 5th IUMRS International Conference on Advanced Materials (ICAM'99)
Beijing - Chine - 31 Mai - 5 Juin 1999
Contact : Kelu@imr.ac.cn

10th International Conference on Rapidly Quenched and Metastable Materials (RQ10)
Bangalore - Inde - 23 - 27 Août 1999
Wesite : http:://www.metalrg.iisc.ernet.in/rqten/

==

Annonces de Soutenance de Thèses

==

Effects of the mechanical milling on carbons : negative electrode materials of Li - ion batteries"
F. Salver Disma - Université de Picardie Jules Verne - **4 Février 98**
Jury : Aymard L., Beguin F., Coulon M., Furdin G, Lassegues JC, Percheron Guegan A., Rouzaud JN, Tarascon JM.

==

"Elaboration et Caractérisations de Cermets Alumine - Métal à partir de poudres obtenues par Mécanosynthèse"
J.-L. Guichard - INPL - Nancy - **23 Janvier 1998**
Jury : A. Simon, C. Carry, F. Thévenot, G. Le Caër, A. Mocellin

==

"Spinelles nanométriques à valence mixte et à fort taux de lacunes cationiques : Transfert électroniques dans un ferrite de molybdène Fe2.47Mo0.53O4, de la synthèse aux propriétés magnétiques dans le système fer - vanadium $Fe_{3-x}V_xO_4$ (0²x<2).
V. Nivoix - Université de Bourgogne - **17 Décembre 1997**
Jury : M. Lenglet, H. Pascard, G. Bertrand, E. Gaffet, M. Guyot, M. Lallemand, A. Rousset, B. Gillot

==

"The Preparation of Nitrides and Carbides by Mechanical Treatment - Phases and Structures"
G.M. Wang - School of Physics, University College, The University of New South Wales - Australian Defence Force Academy - Canberra, ACT 2600 - Australia - **10/12/97**
Supervisor - S.J. Campbell - **Co - Supervisors**: W.A. Kaczmarek and A. Calka

==

"Suivi par Diffraction X en Temps Réel de la Formation par Combustion des intermétalliques des systèmes Al - Ni, Al - Ti, Al - Ni - Ti"
J. F. Javel - Université de Nancy I - **3 Octobre 1997**
Jury : J.F. Berar, F. Bernard, M. Bessiere, M. Dirand, J.C. Gachon, P. Galez, J.C. Jorda

==

"Contribution à l'Etude de la Transformation - Tribologique Superficielle en Fretting"
E. Sauger - Ecole Centrale de Lyon - Génie des Matériaux - **26 Septembre 1997**
Jury : L. Mora - Ponsonnet, P. Blanchard, K. Dang Van, C. Esnouf, E. Gaffet, E. Rosset, A.B. Vannes, L. Vincent

==

"Mechanically induced order-disorder transitions in AlFe"
Thesis by **M. Meyer**, December 1996
presented at Universidad Nacional de La Plata, Argentina - directed by L. Mendoza-Zélis

==

Sites internet à découvrir

Site sur la cristallographie / Soft + Littérature
http://www.lmcp.jussieu/sincris-top/logiciel
N.B. : si vous connaissez d'autres sites en relation avec les thèmes développés par le RFM, faites nous les connaître

==

INFOS PRATIQUES

La Maison de l'Institut de France à Londres propose aux Chercheurs et Etudiants Français devant se rendre dans la capitale britannique pour des recherches, stages et colloques, 14 Chambres au prix de 28 £ (18£ pour les etudiants) (petit déjeuner inclus). Ces chambres sont situées dans le quartier South Kensington, au 8 Queen 's Gate Terrace.
Toute demande d'hébergement à la Maison de l'Institut de France à Londres doit être adressée à Monsieur le Chancelier de l'Institut de France à Londres , à l'attention de Madame Valette Viallard, 23 Quai de COnti- 75006 Paris
(Source : J. Interne de l'Univ. Franche Comté - Mai 1998)

==

Post Doc Position Proposals

Belgique

The Department Metallurgy and Materials Engineering (MTM) of the K.U.Leuven (Belgium) has a research position available. Candidates are asked to contact the responsible staff member.
Area of research :
Metals and Alloys, Polymer Matrix Composites, Intelligent Processing of Materials, Surface Engineering and Tribology, Metal Forming and Mechanical Behaviour of Materials, Quality Control and Non-Destructive Testing of Materials, Ceramics, Thermodynamics, Corrosion, Nuclear Engineering
Description of research task
Tailor made powders by mechanical alloying of Fe and Cu based materials. Application field: specific composite materials, to be prepared by conventional PM consolidation techniques. Research activities: parametric study of MA, alloy design, microscopic
Staff member to be contacted
Prof. Dr. Ir. L. Froyen
Katholieke Universiteit Leuven - Dept. MTM
de Croylaan 2 - B-3001 Leuven (Belgium)
Tel. +32/16/22.09.31

Japon

Our group: Nanocomposite Group, Department of Composite Materials,
National Institute of Materials and Chemical Research, Tsukuba, Ibaraki, Japan
is now looking for post-doc researchers
The candidates would be integrated in the Nanocomposite Group of the Department of Composite Materials. The research interests of the group are mainly focused on nanocomposite preparation and its optical/chemical functionalities. Research projects currently under way aim to develop nanostructured and optically/chemically active thin films by sputtering, laser ablation and so on. For additional information about the Institute and group :
http://www.nimc.go.jp/
http://www.aist.go.jp/NIMC/fcg/index.html
Experience in the fields of materials science (ceramic or metal) is required.
There are two types of post-doc positions.
1. Long-term: from 6 months to 2 years
2. Short-term: from 1 to 3 months
If you or someone in your laboratory is interseted in this fellowship, please contact as soon as possible to:
Dr. Naoto Koshizaki
Department of Composite Materials
National Institute of Materials and Chemical Research(NIMC) 1-1 Higashi, Tsukuba, Ibaraki 305-8565 JAPAN
Tel: +81-298-54-6335
Fax: +81-298-54-6252
E-mail: koshizaki@nimc.go.jp
http://www.aist.go.jp/NIMC/fcg/index.html

Bibliographie Récente

N.B. : En cas de difficultés à vous procurer une copie des articles suivants, n'hésitez pas à contacter E. Gaffet (CNRS / IPSé - Belfort)

Livres ou "Special Issues"

Proceeding du Congrès "Mechanically Alloyed, Metastable and Nancrystalline Materials"- Barcelone (1997)
Editor : M.D. Baro, S. Surinach - Materials Science Forum 269 - 272 (1998)

PERIODIQUES

(Rubrique assurée grâce au concours de Mme TAUZIN - FIN BiPSé)

[38] SOLID-STATE REACTION OF AL/CUO COUPLE BY HIGH-ENERGY BALL MILLING
Xi SQ. Qu XY. Ma ML. Zhou JG. Zheng XL. Wang XT. - J. Alloys & Compounds. 268(1-2):211-214, 1998
The solid state reaction of Al/CuO induced by high-energy ball milling was studied systematically. When the amount of Al was 20 wt%, only reduction occurred. When the amount of Al exceeded 20 wt%, along with the reduction, a synthesis reaction occurred simultaneously. As the amount of Al increased, the reaction products were Cu9Al4, CuAl2 or a Al(Cu) solid solution, respectively. The mechanism of these two types of reactions occurring during ball milling is discussed.

[37] STRUCTURAL CHARACTERIZATION AND REVERSIBLE HYDROGEN ABSORPTION PROPERTIES OF MG2NI RICH NANOCOMPOSITE MATERIALS SYNTHESIZED BY MECHANICAL ALLOYING
Abdellaoui M. Cracco D. Percheronguegan A. - Journal of Alloys & Compounds. 268(1-2):233-240, 1998
Starting from a mixture of Mg and Ni with an atomic ration of 3:1 and using a planetary ball mill, we have successfully elaborated a Mg2Ni rich nanocomposite material formed by the Mg2Ni phase, some residual Ni and an amorphous phase. The synthesis of this composite proceeded at milling intensities 10 and 7, corresponding respectively to 10 and 3.5 W g(-1) shock power, respectively after 4 and 18 h. The best hydrogen absorption capacity reported, 3.53 wt % (3.75 H/mole), is for the composite synthesized at 3.5 W g(-1) shock power and 24 h mechanical alloying time. These mechanical alloying time and hydrogen absorption capacity are better than those reported up today [18,3].

[36] MORPHOLOGY AND HYDROGEN ABSORPTION PROPERTIES OF AN AB(2) TYPE ALLOY BALL MILLED WITH MG2NI
Cracco D. Percheronguegan A. - Journal of Alloys & Compounds. 268(1-2):248-255, 1998
The influence of ball milling an AB(2)-type Laves phase pre-allow with Mg2Ni was investigated from a structural and a morphological point of view. The influence of such a milling on the hydrogen uptake properties was also investigated. It was found out that magnesium did not enter the pre-alloy cell, at least for low energy millings. However, the magnesium did intimately nix with the pre-alloy. Regarding the weakest milling, significant improvement of hydrogen absorption capacity and kinetics were observed. Referring to previous work, this enhancement was attributed to the magnesium enrichment of the surface consequent to ball milling with Mg2Ni.

[35] X-RAY DIFFRACTION STUDY OF MECHANOCHEMICAL SYNTHESIS AND FORMATION MECHANISMS OF ZIRCONIUM CARBIDE AND ZIRCONIUM SILICIDES
Yen BK. - Journal of Alloys & Compounds. 268(1-2):266-269, 1998
The mechanochemical synthesis and formation mechanisms of zirconium carbide (ZrC) and silicides (ZrSi2, ZrSi, Zr5Si3, and Zr2Si) by bail-milling were investigated. The spontaneous formation of zirconium carbide during milling occurred by a mechanically induced self-propagating reaction (MSR), the mechanism of which is analogous to that of the thermally ignited self-propagating high-temperature synthesis (SHS). Under the normal milling condition, the Zr/Si powder mixtures (Si=33-66 at.%) also reacted via the MSR mode to form silicides. The explosive formation of zirconium carbide and silicides could be attributed to their relatively large heats of formation, which made the exothermic reactions self-sustaining once initiated.

[34] BALL-MILLING OF MG2NI UNDER HYDROGEN
Tessier P. Enoki H. Bououdina M. Akiba E. - Journal of Alloys & Compounds. 268(1-2):285-289, 1998
The intermetallic compound Mg2Ni is milled under hydrogen in a high-energy planetary mill. The resulting material is a mixture of heavily deformed Mg2Ni, low-temperature Mg2NiH4, and, possibly, high-temperature Mg2NiH4 structures. The relative amount of each phase depends on the initial hydrogen pressure in the milling vial.

[33] HYDROGEN ABSORPTION PROPERTIES OF A MECHANICALLY MILLED MG-50WT-PERCENT-LANI5 COMPOSITE
Liang G. Boily S. Huot J. Vanneste A. Schulz R. - J. Alloys & Compounds. 268(1-2):302-307, 1998
Mechanical milling was used to make composite Mg-50 wt.% LaNi5 powders. The structural changes during the milling process and the hydrogen storage properties of the mechanically milled composite were characterized. Mechanical milling lends to a nano-composite, which is not stable upon high temperature (573 K) hydriding and dehydriding cycling. The nano-composite transforms to a new Mg+LaHx+Mg2Ni composite, which is stable upon further cycling. The new composite has excellent hydrogen absorption kinetics at low temperatures. The storage capacity reaches 2.5 wt.% in 500 s under 1.5 MPa hydrogen at 302 K. The optimum capacity is 4.1 wt.% at intermediate temperatures (523-573 K). The high absorption rate is explained by the high quantity of phase boundaries and the porous surface structure.

[32] MECHANICAL ALLOYING OF ZN-RICH ZN-AL-CU ALLOYS
Lopezhirata VM. Zhu YH. Saucedomunoz ML. Hernandezsantiago F. - Zeitschr. Metallkunde. 89(3):230-232, 1998

Zn-rich Zn-Al-Cu alloys were produced by milling of elemental powders mixtures, Zn-22 wt.% Al-3 wt.% Cu and Zn-20 wt.% Al-10 wt.% Cu, for times of up to 1080 ks. The X-ray diffraction analysis showed the formation of alpha (aluminum-rich), eta (zinc-rich) and epsilon (CuZn4) phases at the early stage of milling. The presence of epsilon phase was mon evident with the increase of copper content in mixture. In the case of the two alloy compositions. the following phase transformation alpha + epsilon --> eta + tau' was observed to occur during milling. A mixture of eta, alpha and tau' phases was found in powder mixtures milled for 1080 ks, which is in agreement with phases predicted for these compositions in the equilibrium Al-Cu-Zn phase diagram. Finally, all these phases were present on a nanometer scale in both mechanically alloyed powders.

[31] INTERMETALLIC MATRIX COMPOSITES PREPARED BY MECHANICAL ALLOYING - A REVIEW
Koch CC. **-** Materials Science & Engineering A. 244(1):39-48, 1998
This paper reviews research on intermetallic matrix composites synthesized by mechanical alloying. Mechanical alloying, as a powder processing method, results in discontinuous second phases, i.e. dispersoids/discontinuous reinforcements. in the intermetallic matrix. After a discussion of earlier work on dispersoids in intermetallics, intermetallic matrix composites prepared by mechanical alloying will be reviewed for the important structural intermetallics Fe-40 at.% Al, NiAl, Ni3Al, and MoSi2. The unique microstructure and properties of intermetallic matrix dispersoid systems produced by cryomilling will be discussed. The limited studies of nanocrystalline intermetallic matrix composites suggest the possibility of superplastic forming of these materials.

[30] SYNTHESIS OF NANOSTRUCTURED SI3N4/SIC COMPOSITE POWDERS THROUGH HIGH ENERGY REACTION MILLING
Shaw LL. Yang ZG. Ren RM. **-** Materials Science & Engineering A-244(1):113-126, 1998
In this study, synthesis of Si3N4/SiC nanocomposite powders through high energy reaction milling was investigated. Graphite and silicon powders were used as the source of carbon and silicon, respectively, while the source of nitrogen was from either nitrogen or ammonia gases. Effects of milling conditions including the milling speed, milling time, the ball-to-powder weight ratio, the powder mixture composition and cooling conditions on the formation of Si3N4 and SiC were studied. It was found that milling silicon and graphite powders in an ammonia atmosphere followed by annealing in a nitrogen atmosphere is a viable approach for preparing nanostructured Si3N4/SiC composite powders. Further, the formation of Si3N4 and SiC was found to be affected by the milling speed, milling time, the ball-to-powder weight ratio, the powder mixture composition, cooling conditions and the milling atmosphere. Explanations of these effects were provided based on the fundamental processes that occurred during reaction milling.

[29] STRUCTURE AND MAGNETIC PROPERTIES OF ND-FE-B-TI PREPARED BY MECHANICAL ALLOYING
Zhang ZD. Liu W. Sun XK. Zhao XG. Xiao QF. Sui YC. Zhao T. **-** Journal of Magnetism & Magnetic Materials. 184(1):101-105, 1998
The structure and magnetic properties of NdxFeP92-xBS and Nd10Fe76B8-yTi6+y alloys prepared by mechanical alloying (MA) and subsequent annealing have been studied. It has been found that the exchange interaction between a soft alpha-Fe and a hard magnetic Nd2Fe14B phase results in a significant enhancement of the remanence for x < 12. The best values of 4 pi M-r = 8.1 kGs, H-i(c) = 21.1 kOe and (BH)(max) = 14.1 MGOe are obtained for the series of NdxFe92-xB8 with x = 16. For the series of Nd10Fe76B8-yTi6+y, when 0 less than or equal to y less than or equal to 6, the main phase Nd2Fe14B is formed and accompanied by Nd2O3. Fe2Ti and Nd-rich phases. In the present experimental investigation, the occupation state of Ti in the MA samples for 0 less than or equal to y less than or equal to 6 has been considered. The intrinsic coercivity reaches up to more than 11 kOe for 4 less than or equal to y less than or equal to 6. It is evident that the addition of Ti is favourable for the enhancement of the intrinsic coercivity in Nd-Fe-B alloys with a low level of Nd, which is mainly due to the coexistence of the Nd-rich phase and the hard magnetic phase with the structure of Nd2Fe14B containing Ti, combined with the suppression of alpha-Fe, for the samples with 0 less than or equal to y less than or equal to 6.

[28] MECHANOCHEMICAL SYNTHESIS OF DICALCIUM FERRITE WITH THE PEROVSKITE STRUCTURE
Kosova NV. Devyatkina ET. Avvakumov EG. Gainutdinov II. Rogachev AY. Pavlyukhin YT. Isupova LA. Sadykov VA. **-** Inorganic Materials. 34(4):385-390, 1998
Mechanochemical synthesis of dicalcium ferrite with the perovskite structure from anhydrous or hydrated calcium and iron oxides was studied by XRD, DTA, IR spectroscopy, and Mossbauer measurements. The formation of Ca2Fe2O5 from anhydrous oxides during mechanical activation (MA) occurs at a high rate. Although hydrated oxides do not react during MA, Ca(OH)(2) dehydration and subsequent Ca2Fe2O5 formation in preactivated mixtures occur at much lower temperatures (the latter process, at 600 degrees C). The resulting product is well-crystallized and has a specific surface area of 13 m(2)/g, which is large enough for catalytic applications.

[27] RHEOLOGY OF CONCENTRATED ALUMINA SUSPENSION TO IMPROVE THE MILLING OUTPUT IN PRODUCTION OF HIGH PURITY ALUMINA POWDER
Anklekar RM. Borkar SA. Bhattacharjee S. Page CH. Chatterjee AK. **-** Colloids & Surfaces A-Physicochemical & Engineering Aspects. 133(1-2):41-47, 1998
In production of high purity alumina, milling is an important processing step during which particle size has to be reduced to sub-micron size using minimum energy input and avoiding contamination from the milling system. In this investigation, to increase the efficiency of the milling process, the effect of two anionic dispersants were studied in concentrated alumina slurry. The optimized slurry was granulated using freeze drying and the properties of granules and sinters were compared with that using spray drying.

[26] THERMAL STABILITY OF OXYGEN STORAGE PROPERTIES IN A MIXED CEO2-ZRO2 SYSTEM
Hori CE. Permana H. Ng KYS. Brenner A. More K. Rahmoeller KM. Belton D. **-** Applied Catalysis B-Environmental. 16(2):105-117, 1998
CeO2 and CeO2/ZrO2 supports were prepared by two low temperature (500 degrees C) routes: calcination of hydroxide precipitates and firing mixtures of acetates. The supports were loaded with 0.5% Pt and characterized both fresh and aged (at 800 and 1000 degrees C). X-ray diffraction analyses show that a CeO2/ZrO2 solid solution is

formed in the samples prepared by precipitation of the hydroxides and calcination at 500 degrees C. To our knowledge this is the lowest temperature chemical route (not including high energy ball milling) to CeO2/ZrO2 solid solutions yet reported. Samples prepared by firing the acetate mixtures had almost exclusively CeO2 and ZrO2 in separated phases. Oxygen storage measurements showed that the addition of zirconia increased the oxygen storage capacities (on a per gram of catalyst basis) over ceria alone for both preparation methods. In the phase separated materials the amount of reversibly stored oxygen was 1.7-2.5 times more per gram catalyst than that of ceria only. The beneficial effects of zirconia are most pronounced in the solid solutions which had oxygen storage 3-5 times higher than ceria. When the Zr concentration is optimized, the solid solution materials aged at 1000 degrees C showed higher oxygen storage than fresh CeO2. For both preparation methods, the optimal (per gram catalyst) Zr concentration was found to be 25 mol% Zr for samples aged at 1000 degrees C, however, the performance of the solid solution materials was somewhat insensitive to Zr loading between 15 and 50 mol% Zr.

[25] EFFECT OF MILLING ON DENSIFICATION AND DIMENSIONAL TOLERANCE OF SINTERED W-CU ALLOYS

A Upadhyaya, RM German - ADVANCES IN POWDER METALLURGY & PARTICULATE MATERIALS - 1997 (Series: ADVANCES IN POWDER METALLURGY & PARTICULATE MATERIALS), 1997, pp 741-755
1997 INTERNATIONAL CONFERENCE ON POWDER METALLURGY AND PARTICULATE MATERIALS; CHICAGO, ILLINOIS. JUNE 29-JULY 2, 1997

This research examines the effect of milling on the densification and dimensional change for a range of W-Cu alloys. Comilling of tungsten and copper powders enhance densification as compared to mixing. Extensive dilatometry experiments were done to monitor dimensional change. During heating, the compacts prepared from mixed powders swelled between 400 and 600 degrees C. Swelling is detrimental to compact shape retention and densification. Most probably, swelling resulted from reduction of oxygen impurities in the copper. Our calculations show that formation of reduction products within the powder generates a stress of about 98 MPa. This leads to swelling of the copper particles and an overall swelling of the compacts. Compact swelling can be avoided by promoting factors which prevent stress generation within the compacts, such as using low oxygen copper powder, pressing the compact at lower compaction pressure, and using inert sintering atmosphere. Comilling the constituents effectively avoids compact swelling. This paper shows alternative powders or processing routes to minimize swelling.

[24] RAPID MECHANICAL ALLOYING FOR METAL POWDER PRODUCTION

JA Sago, JW Newkirk, GM Brasel - ADVANCES IN POWDER METALLURGY & PARTICULATE MATERIALS - 1997 (Series: ADVANCES IN POWDER METALLURGY & PARTICULATE MATERIALS), 1997, pp 113-1115

An important area of research in the field of powder metallurgy (PM) is the production of alloyed metal powders. Most alloyed metal powders are produced by rapid solidification or milling techniques. Typical problems encountered are compositional control and volume of production, which lead to high costs. Mechanical alloying (MA) is a milling technique that has the capability of producing non-equilibrium powder compositions, without many of the difficulties of rapid solidification processes. However, like most milling processes, MA typically suffers from low production volumes and long milling times. A method for producing sizable volumes of powders in times typically less than an hour has been developed. A ring grinder and a saucer mill have been used to demonstrate the efficiency of this procedure. Powders of several brittle stoichiometric intermetallic compounds have been produced by this method. In addition, this technique has been used to produce metal powders by reducing bulk pieces of existing ductile alloys. MA powders typically are not exposed to high temperatures. Therefore, problems with reactivity and the loss of volatile elements such as occur during high temperature processing can be avoided.

[23] APPLICATION OF MECHANICAL ALLOYING PROCESSING TO THE FORMATION OF CU-C METALLIC COMPOSITE POWDER

KM Lee, HS Kim - ADVANCES IN POWDER METALLURGY & PARTICULATE MATERIALS - 1997 (Series: ADVANCES IN POWDER METALLURGY & PARTICULATE MATERIALS), 1997, pp 1117-1122

It was investigated whether mechanical alloying CMA) processing could be more effective to the formation of Cu-C metallic composite powder. Elemental powder mixtures of Cu-63vol.% C were mechanically alloyed with an attritor in an argon atmosphere and microstructural evolution was examined by X-ray diffraction analysis, scanning electron microscopy, and transmission electron microscopy. It has been found that even with the high volume fraction of immiscible graphite in Cu-C system, the refinement with a few ten nanometer size as well as the highly uniform distribution of the copper phase has been achieved by the MA processing.

[22] SIMOLOYER CM100S, SEMI-CONTINUOUSLY MECHANICAL ALLOYING IN A PRODUCTION SCALE USING CYCLE OPERATION - PART I

H Zoz, D Ernst, T Mizutani, H Okouchi - ADVANCES IN POWDER METALLURGY & PARTICULATE MATERIALS - 1997 (Series: ADVANCES IN POWDER METALLURGY & PARTICULATE MATERIALS), 1997, pp 1135-1142

[21] PHASE TRANSFORMATION BEHAVIOURS OF TI-NI AND TI-NI-CU SHAPE MEMORY ALLOY POWDERS FABRICATED BY MECHANICAL ALLOYING

TH Nam, SG Hur, IS Ahn - ADVANCES IN POWDER METALLURGY & PARTICULATE MATERIALS - 1997 (Series: ADVANCES IN POWDER METALLURGY & PARTICULATE MATERIALS), 1997, pp 1143-1154

Ti-Ni and Ti-Ni-Cu alloy powders have been fabricated by mechanical alloying, and then phase transformation behaviours were investigated by means of X-ray diffraction, scanning electron microscopy, energy dispersive X-ray analysis and transmision electron microscopy. The size of Ti-Ni-Cu alloy powders obtained decreased by increasing Cu-content. The powders of as-milled Ti-Ni and Ti-Ni-Cu alloys whose Cu-contents are less than 5 ato/o were amorphous, whereas those of as-milled Ti-Ni-Cu alloys whose Cu-content is more than 10 at% were crystalline. This means that Cu addition tends to suppress amorphization of Ti-Ni based alloy powders. The monoclinic B19' martensite is formed in the Ti-Ni-Cu alloy powders whose Cu-content is less than 10 at%, whereas the orthorhombic B19 martensite is formed in those whose Cu-content is more than 10 at%. The Fe contamination is reduced by decreasing rotating speed from 350 rpm to 250 rpm.

[20] SINTERING BEHAVIOR OF NANOSTRUCTURED W-CU ALLOYS FABRICATED BY MECHANICAL ALLOYING

JC Kim, SS Ryu, EP Kim, IH Moon - ADVANCES IN POWDER METALLURGY & PARTICULATE MATERIALS - 1997 (Series: ADVANCES IN POWDER METALLURGY & PARTICULATE MATERIALS), 1997, pp 1213-1219

The sintering behavior was investigated for nanostructured W-Cu alloys showing the high sinterability in solid-state sintering and high homogeneity in liquid-phase sintering. The nanostructured(NS) W-Cu composite powders are prepared by mechanical alloying. The compacted NS W-Cu specimens were sintered at the temperatures between 900 and 1400 degrees C, and then sintering behavior was analyzed by sintering shrinkage as well as observing the microstructure development by SEM and TEM. More than 98% of theoretical density was attained for NS W-Cu powder compact after sintering at 1100 degrees C for 1hr. Such a high were mainly due to the agglomeration by the preformed Cu pools in solid-sintering stage and the particle rearrangement in the liquid phase sintering stage.

[19] SELF-PROPAGATING REACTIONS IN MO-SI AND TI-SI SYSTEMS INDUCED BY MECHANICAL ALLOYING

BK Yen, T Aizawa, J Kihara - INNOVATIVE PROCESSING AND SYNTHESIS OF CERAMICS, GLASSES, AND COMPOSITES (Series: CERAMIC TRANSACTIONS), 1998, Vol 85, pp 309-320 - INTERNATIONAL SYMPOSIUM ON INNOVATIVE PROCESSING AND SYNTHESIS OF CERAMICS, GLASSES AND COMPOSITES, AT THE 99TH ANNUAL MEETING OF THE AMERICAN-CERAMIC-SOCIETY; CINCINNATI, OHIO. MAY 4-7, 1997

Mechanical alloying is a solid-state material processing/synthesis technique that typically involves the high-energy ball milling of elemental powder mixtures. Various alloys and compounds, including refractory silicides, can be directly reduced from their elemental constituents by this method. Depending on the material system involved, the compound formation process during mechanical alloying can either proceed gradually or occur by a mechanically induced self-propagating reaction (MSR), the mechanism of which is analogous to that of the thermally ignited SHS. This work attempts to elucidate formation mechanisms ofmolybdenum and titanium silicides during mechanical alloying with a particular reference to MSRs. While molybdenum silicides can be produced by mechanical alloying in the composition range of Si = 25-80 at.%, the MSR occurs only at 67% Si. Moreover, the end-product of such a reaction is $MoSi_2$. In the Ti-Si system, powder mixtures with compositions of Si = 38-50 at.% react via the MSR mode. The results are in agreement with previous SHS studies on the same material systems.

[18] ELECTRON MICROSCOPY STUDY OF TIB REINFORCED NANOCRYSTALLINE TI-MMC'S PRODUCED BY MECHANICAL ALLOYING AND THERMOHYDROGEN PROCESSING OF TIH2-B POWDER MIXTURES

S Ozbilen - PROCESSING OF METALS AND ADVANCED MATERIALS: MODELING, DESIGN AND PROPERTIES, 1998, pp 207-215 - INTERNATIONAL SYMPOSIUM ON PROCESSING OF METALS AND ADVANCED MATERIALS - MODELING, DESIGN AND PROPERTIES AT THE 1998 TMS ANNUAL MEETING; SAN ANTONIO, TEXAS. FEBRUARY 16-19, 1998

Mechanical alloying (MA) synthesizing technology and thermohydrogen processing (THP) were utilized to produce nanocrystalline Ti-MMC's reinforced by TiB intermetallic compound by using TiH_2-B powder mixtures. Powders MA'ed up to 8 hours were examined by X-ray diffraction and SEM study. All MA'ed powders afterwards were HIP'ed at 700, 800 and 950EC for 1 hour. Detailed XRD, SEM and TEM study of the samples were carried out to determine the structure and micrography of the Ti-TiB MMC material processed by MA+THP approach followed by HIP'ing at high temperatures.

[17] USE OF HYDROGEN VIBRATION MILLING IN THE PROCESSING OF NDFEB PERMANENT MAGNETS

VA Yartys, RS Mottram, AF Wilson, IR Harris - RARE - EARTH MAGNETS AND THEIR APPLICATIONS, VOLS 1 AND 2 - PROCEEDINGS OF THE 14TH INTERNATIONAL WORKSHOP, 1996, pp A521-A527 - 14TH INTERNATIONAL WORKSHOP ON RARE-EARTH MAGNETS AND THEIR APPLICATIONS; SAO PAULO, BRAZIL. SEPTEMBER 1-4, 1996

In this work a Hydrogen Vibration Mill (HVM) was designed, constructed and then used to produce NdFeB powders. The hydrogenation and milling were performed in a stainless steel chamber filled with alloy, milling balls and hydrogen (the applied pressure could be varied between 0 and 2 bar). The powder was therefore produced by "dry milling" in a hydrogen atmosphere which facilitates a low oxygen content. The milling chamber was fitted to a vibrating stage which was oscillated at a frequency of 45Hz. The amplitude of vibration was adjustable between 2 and 4 mm. Carbon chromium steel balls provided the milling agent. For a $Nd_{16}Fe_{76}B_8$ alloy, immediate hydrogenation occurred at a pressure of 2 bar and for a 40 gram charge, was complete after between 5 and 20 minutes. The hydrogenated powder was vibration milled for 20-340 minutes at a constant hydrogen pressure of 2 bar. Various processing parameters were investigated and the magnetic properties of the sintered magnets assessed. The powder produced from the HVM was aligned in a pulsed magnetic filed of 4.5T, isostatically pressed and then sintered. The best combination of parameters produced magnets which were almost fully dense, having energy products of up to $305 kJm^{-3}$ (38.3MGOe). It is believed that further improvements in coercivity and squareness can be achieved by using a higher energy HVM.

[16] COERCIVITY AND MAGNETIC ANISOTROPY OF NANOCRYSTALLINE ND-FE-B MAGNETS PREPARED BY MECHANICAL ALLOYING

M Dahlgren, XC Kou, R Grossinger, J Wecker - RARE - EARTH MAGNETS AND THEIR APPLICATIONS, VOLS 1 AND 2 - PROCEEDINGS OF THE 14TH INTERNATIONAL WORKSHOP, 1996, pp B307-B316

Densified nanocrystalline $Nd_{10}Fe_{85}B_5$ and $Nd_{8.9}Fe_{76}Co_{9.5}Si_1B_{4.5}$ magnets have been prepared by mechanical alloying and a hot-pressing process. The hysteresis loops (M-H) of the magnets have been measured in the temperature range from 4.2 to 600 K. The values of the coercivity H_C, the saturation polarization $J(s)$, the remanence $J(r)$ and the ratio $J(r)/J(s)$, were obtained from these hysteresis loops. The measurement of the temperature dependence of the magnetocrystalline anisotropy field H_a has been performed by using the singular point detection (SPD) technique. It is worthwhile to note that, for the first time, the anisotropy field of exchange-enhanced nanocrystalline

Nd-Fe-B has been experimentally determined. It is found that the values of H-a in nanocrystalline Nd-Fe-B are lower than those in corresponding microcrystalline Nd-Fe-B. The measurement of the ac susceptibility was used to determine the spin reorientation temperature. It was detected that the spin reorientation temperature of nanocrystalline Nd-Fe-B is 116 K, which is lower than in microcrystalline Nd-Fe-B (135 K). The grain size as well as the grain size distribution of Nd2Fe14B and alpha-Fe in mechanically alloyed Nd-Fe-B was evaluated by the convolute X-ray line broadening analysis.

[15] THE METAL INJECTION MOLDING OF THE NANOSTRUCTURED W-CU POWDER PREPARED BY MECHANICAL ALLOYING

SS Ryu, H Lee, JC Kim, YD Kim, IH Moon - VALUE - ADDITION METALLURGY, 1998, pp 287-295 - INTERNATIONAL SYMPOSIUM ON VALUE-ADDITION METALLURGY AT THE TMS 1998 ANNUAL MEETING; SAN ANTONIO, TEXAS. FEBRUARY 16-19, 1998

Recently, W-Cu alloy becomes one of the very important candidate materials for heat sink and packaging in the field of microelectronics due to its good thermal properties; The metal injection molding of W-Cu powder can satisfy the requirement for mass production of complex shaped parts in microelectronic devices. In the present study, the application of MIM process to the nanostructured W-Cu powder prepared by mechanical alloying was investigated. The multicomponent binder system of 45PW+15BW+30PE+10SA was proven to be suitable one for the MIM of the W-Cu composite powders by adopting the debinding cycles of multi-stage in N-2 and H-2 atmospheres. Other process conditions for the MIM of the nanostructured W-Cu composite powder were also studied. The MIM debinding part of W-30wt.%Cu was sintered to the relative density of more than 96% by sintering at 1200 degrees C for 1 hour in H-2 atmosphere. Such an improvement of sinterability was attributed to the intrinsic homogenous and fine mixing state of W-Cu phases in nanostructured W-Cu composite powders, and also partly to the effect of the activated sintering by the presence of impurity introduced during the extensive milling.

[14] THERMAL SPRAYING OF NANOCRYSTALLINE NI COATINGS

Lau ML. Jiang HG. Nuchter W. Lavernia EJ. - Physica Status Solidi A-Applied Research. 166(1):257-268, 1998

The present paper describes the synthesis, characterization, and grain growth behavior of nanocrystalline Ni coatings generated using: a novel synthesis approach, namely high velocity oxy-fuel (HVOF) thermal spraying. In the present investigation, the feedstock powders were prepared by mechanical milling in a methanol environment which yielded agglomerates with a flake-shaped geometry and an average grain size of less than 100 nm. The milled powders were then introduced into the HVOF spray system in order to investigate the feasibility of generating a coating with grain sizes in the nanocrystalline range (e.g., <100 nm). Scanning electron microscopy and transmission electron microscopy were used to study the morphology of tie nanometric particles and the microstructure of the milled powders and the as-sprayed coatings. Transmission electron microscopy analysis performed on cross sections of the coating revealed a mixture of fine nanocrystalline grains and elongated coarse grains.

[13] MECHANOCHEMICAL SYNTHESIS OF COMPOUNDS OF TERBIUM AND EUROPIUM WITH PHTHALIC AND TEREPHTHALIC ACIDS [Russian]

Kalinovskaya IV. Karasev VE. - Zhurnal Neorganicheskoi Khimii. 42(9):1456-1458, 1997

[12] MECHANOCHEMICAL ACTIVATION OF (SEO2+NA2CO3) MIXTURE AND SODIUM SELENITE SYNTHESIS IN VIBRATIONAL MILL

Brankovic AR. Vidojkovic VM. Milosevic SD. - J. Solid State Chemistry. 135(2):256-259, 1998

The possibilities of Na2SeO3 mechanochemical synthesis from (SeO2+Na2CO3) stoichiometric mixture were investigated. The experiments mere performed using vibrational mill with rings, On the basis of X-ray diffractograms, IR-spectra, and performed chemical analyses, it has been shown that solid state mechanochemical synthesis of sodium selenite was achieved. By the S-ray and IR-spectra analyses, a qualitative determination of the sodium selenite synthesis dynamics was obtained. The structural changes of input compounds occurring during the mechanical treatment and dynamics of these components' consumption during mechanochemical synthesis were investigated, Based on the layout of the kinetics diagram, if mas concluded that mechanochemical synthesis of sodium selenite, performed under described conditions, appears to be a zero-order reaction.

[11] NON-THERMAL PROCESS FOR EXTRACTING RARE EARTHS FROM BASTNAESITE BY MEANS OF MECHANOCHEMICAL TREATMENT

Zhang QW. Saito F. - Hydrometallurgy. 47(2-3):231-241, 1998

A novel process for extracting rare earths such as Ce, La contained in bastnaesite mineral (ReCO3F, Re = rare earths) has been developed in this work. This process is composed of three steps. The first step is milling of the mixture of bastnaesite and NaOH powders, forming mechanochemically Re(OH)(3) and Na compounds. The second step is washing of the ground mixture with water, removing the soluble Na compounds. The third step is leaching of the washed powder with HCl or H2SO4 solutions at room temperature, extracting the rare earths. The extractive yield of rare earths is improved with an increase in milling time. Furthermore, HCl solution is superior to H2SO4 as a leaching medium. In the present work, more than 90% of the rare earths in the bastnaesite sample was extracted by dilute HCl solution from the mixture milled for 120 min.

[10] ELECTROCHEMICAL CHARACTERISTICS OF A HOMOGENEOUS AMORPHOUS ALLOY PREPARED BY BALL-MILLING MG2NI WITH NI

Nohara S. Fujita N. Zhang SG. Inoue H. Iwakura C. - Journal of Alloys & Compounds. 267(1-2):76-78, 1998

Ball-milling Mg2Ni with metallic Ni (70 wt.% vs. Mg2Ni) lead to the formation of a homogeneous amorphous alloy, which exhibited a maximum discharge capacity of ca. 870 mAh g (Mg2Ni)(-1) at 30 degrees C. Its electrochemical and microstructural characteristics indicated that the homogeneous amorphous structure of the alloy was an important factor for such an improvement in charge-discharge characteristics.

[9] MECHANICAL ALLOYING OF IRON-HEMATITE POWDERS

Ding J. Miao WF. Pirault E. Street R. Mccormick PG. - J. Alloys & Compounds. 267(1-2):199-204, 1998

The structure and magnetic properties of mechanically alloyed and heat treated xFe.(1-x)Fe2O3 powders have been investigated. As-milled powders had a nanocrystalline structure with a particle size of 5-10 nm and consisted of Fe2O3 and Fe3O4 for x less than or equal to 0.2, Fe3O4 and FeO for x=0.2-0.5 and FeO and Fe for x greater than or equal to 5.0. Nanocrystalline metastable FeO decomposed into nanocrystalline Fe3O4 and Fe after annealing at 250-400 degrees C and reformed again to submicron FeO after annealing at temperatures above 550 degrees C. Nanocomposites of Fe3O4/Fe obtained by decomposition after annealing at similar to 300 degrees C exhibited high values of magnetisation and coercivity.

[8] STRUCTURE, PHASE TRANSFORMATION AND MAGNETIC PROPERTIES OF ND-FE-C ALLOYS MADE BY MECHANICAL ALLOYING AND SUBSEQUENT ANNEALING

Sui YC. Zhang ZD. Xiao QF. Liu W. Zhao T. Zhao XG. Chuang YC. **-** J. All.Comp.. 267(1-2):215-223, 1998

Structure, phase transformation and magnetic properties of mechanically alloyed (MA) NdyFe100-1.5yC0.5y, Nd16Fe84-mCm and NdnFe92-nC8, alloys depend sensitively on the compositions and the annealing temperatures. Nd2Fe14C can be formed by a solid state reaction of alpha-Fe with Nd2C3 as well as by a reaction of Nd2Fe17Cx with Nd-C compounds. The thermal stability of Nd2Fe14C increases with the increase of carbon content, reaches a maximum and then decreases. Nd2Fe14C is stable in a triangular shaped area in a status diagram with axes of annealing temperature and composition. To make Nd2Fe14C the main phase, the Nd:C ratio must be kept within a certain range, because too little carbon leads to Nd2Fe17Cx as the main phase, and too much carbon increases the alpha-Fe content, inhibiting the formation of Nd2Fe14C.

[7] HYDRIDING AND DEHYDRIDING CHARACTERISTICS OF MG-LANI5 COMPOSITE MATERIALS PREPARED BY MECHANICAL ALLOYING

Terzieva M. Khrussanova M. Peshev P. **-** Journal of Alloys & Compounds. 267(1-2):235-239, 1998

The hydriding and dehydriding kinetics of composite materials with the nominal composition Mg-x wt.% LaNi5 (x=10, 20, 30) prepared by mechanical alloying of the components in a planetary mill with an acceleration of 12 g have been investigated. It has been shown that the addition of LaNi5 improves the absorption-desorption characteristics of magnesium towards hydrogen, the best achievements belonging to the composite containing 30 wt.% LaNi5. The data obtained on the changes occurring in the phase composition of the samples as a result of hydrogen cycling and available information from the literature have been used to explain the behaviour of the materials during hydriding. Comparison with results on composites with the same nominal composition obtained by other methods shows that mechanical alloying ensures preparation of samples with favourable kinetic characteristics which are hydrided under the softest possible conditions.

[6] ACTIVATION BEHAVIOUR OF ZRCRNI MECHANICALLY MILLED WITH NICKEL

Jung CB. Kim JH. Lee KS. **-** Journal of Alloys & Compounds. 267(1-2):265-269, 1998

AB(2) type Laves phase alloys have some promising properties as a negative electrode in rechargeable Ni/MH batteries because of high electrochemical capacity and good cyclic life. However, they have the disadvantage of requiring many charge-discharge cycles for activation. In this study, the mechanical milling with nickel has been introduced to modify the electrochemical behaviour of the ZrCrNi alloy. A composite-like structure (ZrCrNi+nickel) and nanocrystalline ZrCrNi were obtained through the mechanical milling and the hydrogenation behaviour of the electrode was greatly improved.

[5] MECHANICAL ALLOYING AND HYDROGEN ABSORPTION PROPERTIES OF THE MG-NI SYSTEM

Liang G. Boily S. Huot J. Vanneste A. Schulz R. **-** Journal of Alloys & Compounds. 267(1-2):302-306, 1998

The mechanical alloying process of mixed elemental Mg and Ni was investigated. After milling, we found a mixture of Mg and Mg2Ni in the composition range x>66.67 for MgxNi100-x and a single Mg2Ni phase at the composition x=66.67. The crystallite sizes of Mg and Mg2Ni in the as-milled state were 20 and 10 nm, respectively. The Mg2Ni keeps its nanocrystalline structure when heated to 673 K, whilst Mg grains in the Mg+Mg2Ni composite grow much more rapidly with increasing annealing temperature. The hydrogen storage properties of these nanocrystalline powders were characterized. During the first absorption cycle, we observed that nanocrystalline Mg2Ni absorbs hydrogen more rapidly than the two-phase material. However, after activation, the nanocrystalline Mg+Mg2Ni has better hydriding kinetics at low temperature (423 K) than nanocrystalline Mg2Ni. This is contrary to what was observed in conventional coarse-grained systems. Possible explanations would be that Mg2Ni catalyses the hydrogen chemisorption in the composite and that the phase boundaries enhance hydrogen diffusion. The absorption and desorption enthalpies of Mg and Mg2Ni were evaluated by Van't Hoff plots. The desorption enthalpy increases a little and the absorption enthalpy decreases compared to polycrystalline materials.

[4] MAGNETIC PROPERTIES OF NI NANOPARTICLES DISPERSED IN SILICA PREPARED BY HIGH-ENERGY BALL MILLING

Gonzalez EM. Montero MI. Cebollada F. Dejulian C. Vicent JL. Gonzalez JM. **-** Europhysics Letters. 42(1):91-96, 1998

We analyze the magnetic properties of mechanically ground nanosized Wi particles dispersed in a SiO2 matrix. Our magnetic characterization of the as-milled samples show the occurrence of two blocking processes and that of non-monotonic milling time evolutions of the magnetic-order temperature, the high-field magnetization and the saturation Coercivity. The measured coercivities exhibit giant values and a uniaxial-type temperature dependence. Thermal treatment carried out in the as-prepared samples result in a remarkable coercivity reduction and in an increase of the high-field magnetization. We conclude, on the basis of the consideration of a core (pure Wi) and shell (Ni-Si inhomogeneous alloy) particle structure, that the magnetoelastic anisotropy plays the dominant role in determining the magnetic properties of our particles.

[3] STRUCTURAL DEFECTS AND THERMAL STABILITY OF TI(AL) SOLID SOLUTION OBTAINED BY MECHANICAL ALLOYING

Fadeeva VI. Leonov AV. Szewczak E. Matyja H. **-** Materials Science & Engineering A-Structural Materials Properties Microstructure & Processing. 242(1-2):230-234, 1998

The structure of a metastable Ti(Al) hexagonal close packed (h.c.p.) solid solution obtained by mechanical alloying of the Al50Ti50 powder, was investigated using X-ray diffractometry (XRD). An analysis of the profiles shows physical broadening of (100), (002) and (101) diffraction lines. The probability of stacking faults on the basal (0001) and prismatic (10 (1) over bar 0) planes was determined from the differences between the physical broadening of the (100) and (101) lines which are influenced by the stacking faults and the (002) line which is not affected by the stacking faults. The total concentration of stacking faults is comparable to the values obtained earlier for AI-Ti solid solutions deformed by filing. Thermo-desorption and mass-spectrometry showed that, during mechanical alloying, about 1 at.% of hydrogen is dissolved in the alloy. A significant amount of this hydrogen contributes to the formation of stacking faults on the basal and prismatic planes. The temperature range within which the metastable h.c.p. structure is transformed inter the equilibrium AlTi (L1(0)) structure was determined by DSC calorimetry. The transition of the Ti(Al) solid solution into the AlTi intermetallic proceeds through an intermediate stage of the metastable f.c.c. phase with a lattice parameter a = 0.4012 nm.

[2] MECHANICAL ALLOYING IN THE FE-CU SYSTEM

Jiang JZ. Gente C. Bormann R. - Materials Science & Engineering A-Structural Materials Properties Microstructure & Processing. 242(1-2):268-277, 1998

The studies of mechanical alloying on the Fe-Cu system, as a model system for those with positive heats of mixing, are reviewed. Several problems involved in the mechanical alloying process are discussed. For example, (1) whether alloying occurs on an atomic level; (2) what the solid solubility in the Fe-Cu system is; (3) where the positive energy is stored in the alloys; (4) what the decomposition process of the supersaturated alloys is; and (5) what type of magnetic properties the new materials have. The elucidation of these problems will shed light on the understanding of the mechanisms for the preparation of materials under highly son-equilibrium conditions in systems with positive heats of mixing by mechanical alloying.

[1] AMORPHOUS-NANOCRYSTALLINE-AMORPHOUS PHASE TRANSFORMATIONS IN SE INDUCED BY MECHANICAL ATTRITION

Guo FQ. Lu K. - Philosophical Magazine Letters. 77(4):181-186, 1998

In this work, we report the first observation of mechanically driven amorphous-nanocrystalline-amorphous phase transformations in Se during ball milling. Complete nanocrystallization of a glassy Se sample and complete amorphization of a nanocrystalline Se sample were realized by mechanical attrition, which provides a unique process for highlighting the intrinsic phase equilibrium between the glassy and nanocrystalline states.

==

Les membres du RFM ayant déjà réglé leur cotisation sont indiqués sur l'annuaire par (1998)
(Members having paid the RFM contribution are indicated by (year) in the RFM list)

Bulletin d'adhésion 1998 / Subcription Print

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

Eric GAFFET

UPR CNRS 423 - Groupe "Nanomatériaux : Elaboration et Transitions de Phases Hors Equilibre"

IPSé - F90010 - Belfort Cedex - F'rance

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 be a member of the French Mechanical Alloying Network

Chèque ci joint / Check enclosed in the amount of :

(Please do not use Eurocheck, the taxes do correspond to 40% of the amount of the check).

Correspondants du Réseau Français de Mécanosynthèse
116 Laboratoires ou Groupes de Recherche, 167 Correspondants

Bureau : E. Gaffet (Président), G. Le Caër (Secrétaire Général), A.R. Yavari (Trésorier)

les personnes précédées par "•" sont inscrites sur la liste de diffusion électronique du RFM

==

Allemagne

- K.U. Kainer — Institüt für Werkstoffkunde und Werstofftechnik " Light Metals, Powder Metallurgy and Composites Group - Agricolastr. 6 - D 38678 - Clausthal Zellerfeld - Allemagne
- A Sagel — Institut für Metallphysik und Technologie - Technische Universität Berlin - Hardenbergstr 36 - PN 2 - 3 - D - 10623 - Berlin - Allemagne
- M. Veith — Universitat des Saarlandes, Insitut für Anorganische Chemie - Postfach 15 11 50 - D 66041 - Saarbruchken - Allemagne

Argentine

- F.H. Sanchez (97) — **Dpto de Fisica** - Universidad Nacional de La Plata - CC67 - 1900 La Plata - Argentina
- L. Mendoza - Zelis (97) — **Dpto de Fisica** - UNLP - CC 67 - 1900 La Plata - Argentine

Australie

- A. Calka(1997) — **Dep. Materials Engineering** - University of Wollongong - NSW 2522 - Australie
- S.J. Campbell — School of Physics - University College - The University of New South Wales - Australian Defence Force Academy - Canberra ACT 2600 - Australie.
- Y. Chen (1997) — **Dep.Elec. Mat. &Eng.** - RSPHYSSE - The Australian Nat. Univ. - Canberra ACT 0200 -
- J. Harrowfield (1998) — **Chemistry Department- Un. of Western Australia** - Nedlands - WA 6907 - Australie
- F.J. Lincoln — **Special Research Centre for Advanced Mineral and Materials Processing** - Univ. Western Autralia - Nedlands, Perth - Western Autralia 6907 - Australie
- J. Nikolov — The Australian National University - Canberra ACT 0200 - Australie.
- W. Kaczmarek — **Dpt Appl. Mathematics** - Institute of Advanced Studies - Research School of Physical Sciences & Engineering - The Australian National University - Canberra ACT 0200 - Australie.

Brésil

- W.J. Botta - Filho — **Dept. Eng. Mater.** - Univ. Federal Sao Carlos - CP 676 - 13565 - 090 - Sao Carlos Sp. - Brésil
- A. de Matos Rias — R. Alberto Barbosa 266 - CEP 91320 - 040 - Vila Ipiranga - Porto Alegre - RS - Brésil
- R. S. de Figueiredo(97) — **Lab. Magn.& Mat. Magn.** - Dep. de Fisica - Cxp 6030 - 60.455 - 760 Fortaleza CE - Bresil

Canada

- J. Huot* — **IREQ - Techn. des Matériaux** - 1800 Boul. L. Boulet - Varennes, Quebec, Canada J3X ISI
- J.-Y. Huot — **Noranda Technology Centre** - 240 Hymus Blvd - Pointe Claire - Que, H9R 1G5 - Canada
- L. Roué (1998) — **INRS - En. & Mat.** - 1650 Bd Lionel Boulet - Case Postale 1020 - Varennes (Québec) J3X 1S2

A. Van Neste — Mines & Métallurgie - Un. de Laval - Pav. Pouliot, Ste - Foy Campus - GIK 7P4 - Quebec - Canada

- W.J. D. Shaw — Dept. Mech. Eng. - University Calgary - T2N 1N4 - Calgary Alberta - Canada

Corée du Sud

- J.-H. Ahn — **Dept. Materials Engineering - Andong National University** 388 Songchon - Dong, Andong, Gyungbuk 760 749 - Corée du Sud
- S. H. Hong — **Dept. Mat. Sci. & Eng. - Korean Advanc. Inst. of Science and Technology** 373 - 1 Kusong - Dong, Yusung - Gu - Taejon, 305 - 701 - Corée du Sud

Croatie

- M. Stubicar (1998) — **Department of Physics** - Faculty of Science, P.O. Box 162 - 10001 Zagreb - Croatie
- Andjelka. Tonejc — **Dpt Physics** - Lab. Microstr. Investig. - Bijenicka 32 - PO Box 162 - 10001 Zagreb - Croatie
- Antun Tonejc — **Dpt Physics** - Lab. Microstr. Investig. - Bijenicka 32 - PO Box 162 - 10001 Zagreb - Croatie

Danemark

- J. Z. Jiang — **Dept Physics** - Tech. Univ. Denmark - Bldg 307 - DK 2800 - Lyngby - Danmark

Espagne

- P. Crespo(1997) — **CENIM - CSIC**, Avda G de Amo, 8 - 28040 - Madrid Espagne

Grèce

- G. Kiriakidis — **Materials Group** - Institute of Electronique Structure and Laser (IESL) Foundation for Research and Technology - Hellas (Forth) Science & Technology Park of Crete - Vassilika Vouton, Heraclion Crete P.O Box 1527 GR - 71110 - Grèce

Hongrie

- T. Kemeny (1997) — Research Institute for Solid State Physics - 1525 Budapest - P.O. Box 49 - Hongrie
- L.K. Varga — Research Institure for Solid State Physics - P.O.B. 49 - H- 1525 - Hongrie

Inde

• B.S. Murthy	Dpt Metallurgical & Materials Engineering - Indian Institute of Technology - Kharagpur - 721 302 - Inde

Israel

• M.P. Dariel	**Dept. Materials Engineering** - Ben Gurion University of the Negev - Beer Sheva - Israel
• N. Frage	**Dept. Materials Engineering** - Ben Gurion University of the Negev - Beer Sheva - Israel
• E. Gutmanas	**Technion** - Israel

Italie

• D. Basset (1998)	M.B.N. srl - Via Roma -4 - I31020 - San Vendemiano (TV) Italie
• S. Enzo	**INFM & Dipartimento di Chimica** - Univ. Sassari - Via Vienna 2 - 07100 Sassari - Italie
• M. Magini (1997)	**ENEA -** Dipart INNOVAZIONE - C.R. Casaccia - Via Anguillarese, 302 - I00060 Rome - Italie
• P. Pierrat*	**Dipartimento di Scienze e Technologie Chimiche** Università degli Studi di Udine - Via del Cotonificio 108 - 33100 Udine - Italie

Japon

• J.Y. Huang	Nat. Inst. Research in Inorganic Materials (NIRIM) - Namiki 1 - 1, Tsukuba, Ibaraki -305 Japon
• M. Senna	Keio Univ.-Fac. Sci. Tech. -Dpt. Appl. Ch..- 3-14-1 Hiyoshi Kohoku-ku-223 Yokohama - Japon
• M. Umemoto	**Fac. Engin. -** Toyohashi Univ. Technology - Tempaku - Cho Toyohashi Aichi 441 - Japon

Pologne

• T. Janta	**Technical University of Wroclaw** - Inst. of Electric Machines & Drive - Wybrzeze Wyspianskiego 27 - Wroclaw 50 - 370 - Pologne
• D. Oleszak	**Dept Mater. Sci.& Eng.** - Warsaw Univ. Techn. - Nabutta 85 - 02 - 524 - Pologne
• B. Weglinski	**Technical University of Wroclaw** - Inst. of Electric Machines & Drive - Wybrzeze Wyspianskiego 27 - Wroclaw 50 - 370 - Pologne

Portugal

• B. Oliveira e Costa (97)	**Dpto de Fisica -** Faculdada de Ciencias et Tecnologia - Universidade de Coimbra - 3000 Coimbra - Portugal

Russie

• N.Z. Lyakhov	**Inst. Sol. State Chem.** - Russian Acad Sci. - Kutaleladze, 18 - Novosibirsk - 630128 Russia
• R.Z. Valiev	**Ufa State Aviation Technical University** - Inst. of Physics of Advanced Materials - 12 K. Marks Str., UFA 450000 - Russie
• A.N. Strelestskii	**Inst. Chem. Phys.** - RAS, Dept Kinetics & Catalysis - Kosygina Str. 4 - Moscou - Russie
• A. Y. Yermakov	**Applied Magnetism Lab** - InstituteMetal Physics - 18 S. Kovalevskaya St. - GSP - 170 - Ekateringurg - 620219 - Russie

Singapour

• Lu Li	Dpt Mechanical and Production Engineering - The National University of Singapore - 10 Kent Ridge Cresent - Singapore - 119260 - Singapour

Suéde

• A. Salwen	**Swedish Inst. Metals Res.** - Drottning Kristinas V. 48 - Stockholm S 114 - 28 - Suède
• S.J. Savage	**Dept of Materials** - Defence Research Establishment - SE - 172 90 - Stockholm - Suède

U.S.A.

• P. Bellon	**Dpt Materials Science and Engineering** - 1304 W. Green St. - Urbana IL 61801 - USA
• E. Y. Ivanov	**Tosoh SMD Inc,** 3600 Gantz Road, Grove City - Ohio 43123 USA
• J.N. Newkirk	**Dept Metallurgical Eng.** - Univ. Missouri - Rolla - Rolla MO 65409 USA.
• L. Takacs	Univ. Maryland - Baltimore Country - Dpt Physics - 1000 Hilltop Circle - USA

Viet Nam

• Pham Khac Hung	ITIMS - 1 Round, Dai Co Viet, Hanoi Viet Nam

France

• H. Ageorges*	**Lab. Thermodyn. Trait. Poudres** - Fac. Sciences - 2 Bd Lavoisier - F49045 - Angers Cedex
• M. Arigon (1998)	**Roucaire Instruments Scientifiques -** 2, Avenue du Pacifique, Les Ulis - BP 78 F91943 Courtaboeuf Cedex
• L. Aymard	**LCRS** - 33 Rue de Saint Leu - F80039 - Amiens Cedex
• D. Aymes (1997)	**LRRS** - CNRS UMR 5613 - Equipe "Matériaux à Grains Fins" - Université de Bourgogne UFR Sciences et Techniques - 9 Avenue Alain Savary - BP400 - F21011 Dijon Cedex
• M.-I. Baraton (1997)	**LMCTS ESA 6015** - Fac des Sciences 123 Avenue A. Thomas - F87060 Limoges Cedex
• J.-F. Baumard*	**ENSCI -** 47 Avenue A. Thomas - F87065 Limoges Cedex
• S. Begin - Colin (1998)	**LSG2M- CNRS** - Ecole des Mines - F54042 - Nancy Cedex
• F. Bernard *	**LRRS** - CNRS UMR 5613 - Equipe "Matériaux à Grains Fins" Faculté des Sciences de Mirande - BP 138 - F21004 - Dijon Cedex

• Ph. Blanchard (1997)	**Saft Recherche -** Route de Nozay - F91460 Marcoussis
• J.L. Bobet (1998)	ICMCB - Bordeaux
A. Briantais (1997)	**CREPI - PSA -** Direction des Methodes et Equipements Industriels - Batiment Forge Route de Chalampé - BP 1403 - F68071 Mulhouse Cedex
• J.-M. Castillo (1997)	**Faure Equipements** - BP 52 - 21 Rue Santos Dumont - F87002 Limoges Cedex
• L. Chaffron *	**CEN Saclay** - DTA / CEREM / DECM / SRMP - F91191 - Gif/Yvette Cdx
• F. Charlot*	**LRRS - CNRS** UMR 5613 - Equipe "Matériaux à Grains Fins" - Université de Bourgogne UFR Sciences et Techniques - 9 Avenue Alain Savary - BP400 - F21011 Dijon Cedex
• P. Chartier (1997)	**Lab. Métal. Phys.** - URA CNRS 131 - Bd 3, Téléport 2 - BP 179 -F86960 - Futuroscope Cedex
• B. Cheng (1997)	**LRRS - CNRS** UMR 5613 - Equipe "Matériaux à Grains Fins" - Université de Bourgogne UFR Sciences et Techniques - 9 Avenue Alain Savary - BP400 - F21011 Dijon Cedex
• G. Cornella*	**Schneider Electric** - Dir. Rech. Matériaux/A3 - Rue Henri Tarze - F38050 - Grenoble Cedex 9
• D. Cracco (1998)	CNRS - Lab de Chimie Métallurgique des Terres Rares - 2 - 8 Rue H. Dunant - F94320 Thiais
• E. Cure*	**LSG2M- CNRS** - Ecole des Mines - F54042 - Nancy Cedex
• A. Demortier (1998)	LASIR - HEI (CNRS UPR 2631) - 13 Rue de Toul - F59046 Lille Cedex
• J.-L. Derep*	**ETCA/CREA/MCS20** - 16 bis Av. Prieur de la Côte d'Or - F94114 - Arcueil Cedex
• C. Djega - Mariadassou*	**Lab. de Structure des Mat. Métal.** - Bât. 413 - 414 - Un. Paris Sud - F91405 - Orsay Cedex
• J. Dodds (1997)	**Ecole des Mines d'Albi -** Campus Jarlard - F81013 Albi Cedex 04
• E. Duverger (1997)	**LMIT** - IUT Belfort - BP 527 - 90016 - Belfort Cedex
• O. El Kedim (1997)	**Laboratoire de ThermoMécanique** - IPSé - F90010 - Belfort Cedex
• J. Etourneau*	**ICMCB** - Chateau Brivagnac - Avenue Schweitzer - F33608 - Pessac Cedex
• J.-P. Eymery (1997)	**Lab. Métal. Phys.** - URA CNRS 131 - Bd 3, Téléport 2 - BP 179-F86960 - Futuroscope Cedex
• N. Feninèche (1997)	**Laboratoire de ThermoMécanique** - IPSé - F90010 - Belfort Cedex
• A. Fnidiki (1998)	**Lab. Magn. & Appl.** -URA 808 -Univ. Rouen-UFR Sci.& Tech-F76821 - Mt St Aignan Cdx3
• J. Foct (1997)	**Lab. de Métallurgie Physique** Univ. Lille 1 - Bat C6 - 2ème Et. -F59655 - Villenuve d'ascq
• J. - O. Fourcade (1997)	**LPMS - CNRS D0407** - Univ. Montpellier II - Sci. et Techn. du Languedoc Place E. Bataillon - F34095 - Montpellier Cedex 5
• D. Fruchart (1998)	**Lab. de Cristallographie -** UPR CNRS 5031 - BP 166 - F38042 - Grenoble Cedex
• J. - C. Gachon (1998)	**Lab. Thermodyn. Mét.** - URA CNRS 158 - Univ. Nancy I - B.P. 239-54506-Vandoeuvre Cdx
• E. Gaffet (1997)	**CNRS UPR 423** "Elab. et Transitions de Phases Hors Equilibre"-IPSé -F90010 - Belfort Cedex
• J.P. Ganne (1997)	**Lab. Central de Recherches** - Thomson CSF Domaine de Corbeville - F91404 - Orsay
• T. Girot (1998)	**LSG2M- CNRS** - Ecole des Mines - F54042 - Nancy Cedex
• P -F. Gobin*	**INSA de Lyon** - Bat. 502 - Lab. Physique des Matériaux - F69621 - Villeurbanne Cedex
• C. Goujon (1998)	Ecole des Mines - St Etienne - France
• F. Goutenoire (1998) Cdx	Lab. Fluorures - UPRES CNRS A 6010 - Fac des Sciences - Av. O. Messiaen - 72985-Le Mans
• C. Gras	**LRRS** - CNRS UMR 5613 - Equipe "Matériaux à Grains Fins"- Université de Bourgogne UFR Sciences et Techniques - 9 Avenue Alain Savary - BP400 - F21011 Dijon Cedex
• J- M. Greneche *	**Eq. Physique de l'Etat Condensé** - Univ. du Maine - Fac Sciences - F72017 - Le Mans Cdx
• T. Grosdidier	LETAM - Université de Metz - 57045 Metz Cedex 01
• D. Guerard (1997)	**Lab. Chimie du Sol. Minéral - CNRS** - B.P. 239 - Vandoeuvre les Nancy Cedex
• P. Guigon (1998)	**Université de Compiègne - Génie Chimique -** BP 529 - F60205 - Compiègne
• B. Guilhot*	ENSMSE -**Lab. Physicochimie Matériaux** -158 Cours Fauriel - F42023 St Etienne Cdx
• V. Hays*	**Lab. de Génie des Matériaux** - ISITEM - CP3023 - F44087 - Nantes cedex 03
• F. Hehmann*	**Conseiller Scientifique ONERA** - 17 - 19 Rue Houdan - F92330 - Sceaux
• J. - C. Jumas (1997)	**LPMS - CNRS D0407** - Univ. Montpellier II - Sci. et Techn. du Languedoc Place E. Bataillon - F34095 - Montpellier Cedex 5
• Ph. Kapsa (1997)	**Lab. Tribologie & Dynamique des Systèmes** - UMR CNRS 5513 Dpt de Technologie des Surfaces - Ecole Centrale de Lyon, BP 163 - F69131 Ecully Cedex
• D. Klein	LMIT - Portes du Jura - F25000 Montbéliard
• F.A. Kuhnast (1997)	LCSM - URA CNRS 158 - Univ. H. Poincaré - Nancy I - F54506 Vandoeuvre Cedex
• Y. Labaye*	**Eq. Physique de l'Etat Condensé** - Univ. du Maine - Fac Sciences - F72017 - Le Mans Cdx
• P. Lacorre1998) Cdx	Lab. Fluorures - UPRES CNRS A 6010 - Fac des Sciences - Av. O. Messiaen - 72985-Le Mans
• M. Latroche	**LCMSTR - CNRS** - 1 Place A. Briand - F92195 - Meudon Cedex
• G. Le Caër (1998)	**LSG2M- CNRS** - Ecole des Mines - F54042 - Nancy Cedex
• N. Lecomte (1997)	**Ressources en Innovation** - 49 Rue Edouard Herriot - F69002 Lyon
• J.M. Lecuire*	**Lab. d'Electrochimie des Matér.** - Univ. de Metz - Ile de Saulcy - F57045 - Metz Cedex
• C. Lemoine (1998)	**Lab. Magn. & Appl.** -URA 808 -Univ. Rouen-UFR Sci.& Tech-F76821 - Mt St Aignan Cdx3
• C. Lenain	Lab Réactivité & Chimie des Solides - CNRS Unversité d' 80039 Amiens - France
• C Levaillant*	**Centre Matériaux** - Ecole Mines d'Albi Carmaux - Rue de la Poudriére-F81013 - Albi Cedex 09
• N. Lorrain (1998)	**CEN Saclay** - DTA / CEREM / DECM / SRMP - F91191 - Gif/Yvette Cdx
• P.-F. Louvigné	**ETCA/CREA/MCS10** - 16 bis Av. Prieur de la Côte d'Or - F94114 - Arcueil Cedex
• B. Malaman (1998)	**Labo de Chimie Minérale** - Univ. de Nancy I - B.P. 239 - F54406 - Vandoeuvre Cedex
• C. Massobrio (1997)	**IPCMS - Groupe Etude Matériaux Métal.** - 23 Rue du Loess - F67037 - Strasbourg Cedex
• V. Mathae*	3 Rue des Champs - F68720 - Tagolsheim
• C. Meunier (1998)	**LMIT** - Portes du Jura - F25000 Montbéliard
• D. Michel (1997)	**CECM / CNRS** - 15 Rue G. Urbain - F94407 - Vitry / Seine Cedex
• P. Millet*	**CEMES -** UPR CNRS 8011 - 29 Rue Jeanne Marvig - BP 4347- F31055 Toulouse Cedex
• N. Millot*	**LRRS** - CNRS UMR 5613 - Equipe "Matériaux à Grains Fins"- Université de Bourgogne

	UFR Sciences et Techniques - 9 Avenue Alain Savary - BP400 - F21011 Dijon Cedex
• Ph. Molinié (1998)	**IMN** - UMR CNRS 110 - 2 Rue de la Houssinière - BP 32229 - F44322 - Nantes Cedex 03
• C. Monty (1998)	IMP - CNRS - BP5 - Odeillo - F66125 Font Romeu Cedex
G. Moulin	**Lab. de Métallurgie Structurale** -URA 1107 - Bat. 413 -Un. ParisXI -F91405 - Orsay Cdx
• F. Nardou (1997)	**LMCTS** - Eq. "Céramiques Nouvelles" - 123 Avenue Albert Thomas - F87060 - Limoges Cedex
• M. Nathl (1998)	ICMCB - Bordeaux
G. Nicolas (1997)	**CIME Bocuze SA** - BP 301 - St Pierre en Faucigny - F74807 - La Roche / Foron Cedex
• J.-C. Niepce*	**LRRS** - CNRS UMR 5613 - Equipe "Matériaux à Grains Fins"- Université de Bourgogne UFR Sciences et Techniques - 9 Avenue Alain Savary - BP400 - F21011 Dijon Cedex
T. Nowicki	**Comptoir Lyon - Alemand - Louyot** - Centre Recherches - 8, Rue Portefoin-F75003 - Paris
• H. Pascard	**Laboratoire des Solides Irradiés** - Ecole Polytechnique - F91128 Palaiseau Cedex
H. Pastor*	**CERMEP** - 54 Avenue Rhin et Danube - F38100 - Grenoble
• F. Pellerin	**Turboméca** - 64511 - Bordes Cedex
• A. Percheron-Guegan(97)	CNRS - Lab de Chimie Métallurgique des Terres Rares - 2 - 8 Rue H. Dunant - F94320 Thiais
• P. Perriat*	**LRRS** - CNRS UMR 5613 - Equipe "Matériaux à Grains Fins"- Université de Bourgogne UFR Sciences et Techniques - 9 Avenue Alain Savary - BP400 - F21011 Dijon Cedex
• M.-P. Pileni	**Lab. S.R.S.I** - Université P. et M. Curie - BP52-Bat 74-6ème Et-4 Place Jussieu-F75005-Paris
• P. Pochet*	**CEN Saclay** - DTA / CEREM / DECM / SRMP - F91191 - Gif/Yvette Cedex
• R. Rahouadj*	**Laboratoire de ThermoMécanique** - IPSé - F90010 - Belfort Cedex
• N. Randrianantoandro *	**Eq. Physique de l'Etat Condensé** - Univ. du Maine - Fac Sciences F72017 - Le Mans Cdx
• D. Ravot	**Lab. Phys. Mat. Cond.** - Univ. Montpellier II-Place E. Bataillon-F34095-Montpellier Cdx5
• R. Retoux (1998)	Lab. Fluorures - UPRES CNRS A 6010 - Fac des Sciences - Av. O. Messiaen - 72985-Le Mans Cdx
• S. Revol (1998)	**CENG- CEREM** - 17 Rue des Martyrs - F38054 - Grenoble Cedex 9
S. Rimlinger (1997)	**CERMEP** - 54 Avenue Rhin et Danube - B.P. 62 - 38041 Grenoble Cedex 9
• B. Rondot*	**LMIT** - IUT Belfort - BP 527 - F90016 - Belfort Cedex
• M. Sarfati (1997)	**ETCA** - 16 bis avenue du Prieur de la Cote d'Or - F94114 Arcueil Cedex
• H. Scherrer*	**LSPM - URA CNRS 155** - Ecole des Mines - Parc de Saurupt - F54042 - Nancy Cedex
• G. Silly*	**Eq. Physique de l'Etat Condensé** - Univ.Maine - Fac Sciences - F72017 - Le Mans Cedex
• H. Souma (1997)	**LRRS** - CNRS UMR 5613 - Equipe "Matériaux à Grains Fins" - Université de Bourgogne UFR Sciences et Techniques - 9 Avenue Alain Savary - BP400 - F21011 Dijon Cedex
• N. Spath (1997)	**Comptoir Lyon - Alemand - Louyot** - CR - 8, Rue Portefoin - F75003 - Paris
M. Stamm (1997)	**C2M Technology** - C.E.E.I Zone Industrielle Ste Agathe - Rue Lavoisier- F57192 - Florange
• J. Steinmetz (1998)	**Labo de Chimie Minérale** - Univ. de Nancy I - B.P. 239 - F54406 - Vandoeuvre Cedex
• H. Szwarc (1998)	Lab. Chimie Phys. Mat. Am. - CNRS URAD1104 - Bat. 490 - Univ. Paris Sud - Orsay F91405
• J. Teillet (1998)	**Lab. Magn. & Appl.** -URA 808 -Univ. Rouen-UFR Sci.& Tech-F76821 - Mt St Aignan Cdx3
• F. Thévenot (1998)	**ENSMSE** - Lab. Céramiques Spéciales - 158 Cours Fauriel - F42023 - Saint Etienne Cedex
• G. Thomas*	**Centre SPIN** - Ecole des Mines - 158 Cours Fauriel - F42100 - St Etienne
• I. Tkatchenko (1997)	**CNRS/ Institut Recherche Catalyse** - 2 Avenue A. Einstein -F69626 Villeurbanne Cedex
• J.-P. Touboul (1997)	**Engelhard - CLAL**, BP 145, 41 Rue de Paris, F93136 Noisy le Sec Cedex - France
A. Venot (1997)	**SINTERTECH** -Centre R & D- Voie des Collines - F38800 Le Pont de Claix - France
• R. Welter (1997)	**Labo de Chimie Minérale** - Univ. de Nancy I - B.P. 239 - F54406 - Vandoeuvre Cedex
• R. Yavari	**INPG - LTPCM - CNRS URA 29** - ENSEEG, 1130 Rue de la Piscine Domaine Univ. - BP 75 - F38042 - Saint Martin d'Hères - France
• M. Zeghmati (98)	**LMIT** - IUT Belfort - BP 527 - F90016 - Belfort Cedex
• M. Zouggar (1998)	**Lab. Métal. Phys.** - UMR 6630 - Bd 3, Téléport 2 - BP 179 -F86960 - Futuroscope Cedex
• C. Zinc *	Thann & Mulhouse, Usine de Thann-Serv. PCA-95 Rue du Gal de Gaulle BP 34- 68801 Thann Cdx

==

N.B. : Pour la rédaction du prochain N° de la Lettre du Réseau Français de Mécanosynthèse, tout(e) article, annonce, thèse ... peut être envoyé(e) à : Eric Gaffet - CNRS UPR A0423
Groupe "Nanomatériaux : Elaboration et Transitions de Phases Hors Equilibre"
IPSé - F90010 Belfort Cedex
Tél. : 84 - 58 - 31 - 02 / Fax : 84 - 58 - 30 - 27
E-mail : Eric.Gaffet@utbm.fr