



Volume 586, Supplement 1

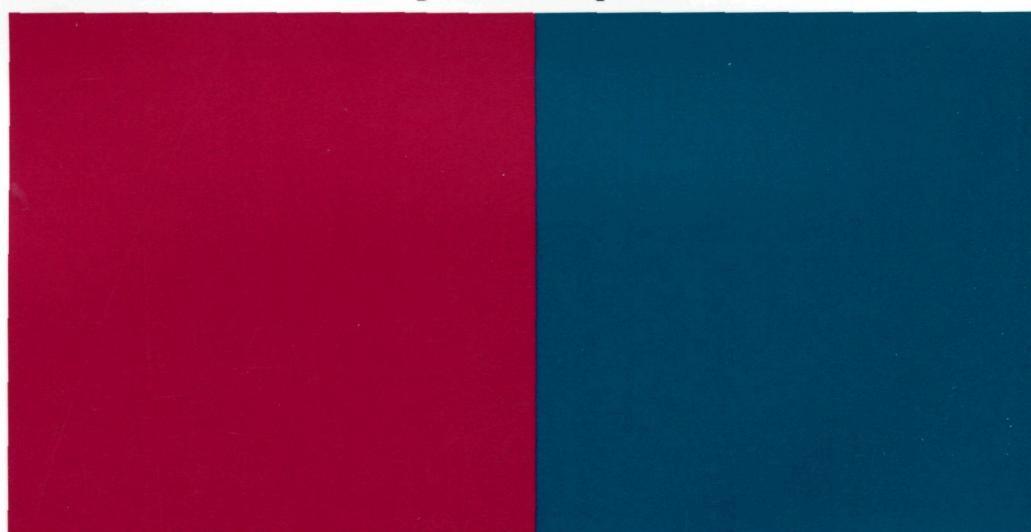
15 February 2014  
ISSN 0925-8388

# Journal of ALLOYS AND COMPOUNDS

An Interdisciplinary Journal  
of Materials Science and  
Solid-State Chemistry and Physics

**EDITOR-IN-CHIEF**  
L. SCHULTZ

**EDITORS**  
K.H.J. BUSCHOW  
J. CHAN  
D.G. ESKIN  
H. FAN  
J.-M. GRENECHE  
V.G. HARRIS  
H. KLEINKE  
C. KOCH  
H.G. PAN  
V. PECHARSKY  
H. SAKAGUCHI  
H. ZUR LOYE



**SI: ISMANAM 2012**

**Guest Editors:** Sergey Kaloshkin  
Victor Tcherdyntsev  
Vladimir Khovaylo

**Contents**

**Abstracting Services** Abstracted/indexed in: Cambridge Scientific Abstracts, Ceramics Abstracts, Chemical Abstracts, Current Contents, Engineering Index, FIZ Karlsruhe, Metals Abstracts, PASCAL/CNRS, Physics Abstracts, Physikalische Berichte, Research Alert, Science Citation Index. Also covered in the abstract and citation database SCOPUS.® Full text available on ScienceDirect.®

**Editorial**

## Preface

- S. Kaloshkin, V. Tcherdyntsev and V. Khovaylo ..... S1

**Bulk metallic glasses**

## Vitrification and devitrification processes in metallic glasses

- D.V. Louzguine-Luzgin (Sendai, Japan) ..... S2

## Thermodynamics and fragility of glass-forming alloys

- L. Battezzati and G. Dalla Fontana (Torino, Italy) ..... S9

## Comparison of mechanical response in CuZrAl-V and CuZrAl-Co bulk metallic glass composites

- C.N. Kuo, J.C. Huang, X.H. Du (Kaohsiung, Taiwan, ROC), X.J. Liu (Xiamen, PR China) and T.G. Nieh (Kaohsiung, Taiwan, ROC), (Knoxville, USA) ..... S14

## Metastable primary precipitation phases in multicomponent glass forming Fe-base alloys with metalloids

- I.V. Lyasotsky, N.B. Dyakonova and D.L. Dyakonov (Moscow, Russia) ..... S20

Air-oxidation of a Pd<sub>40</sub>Ni<sub>40</sub>P<sub>20</sub> bulk glassy alloy at 250–420 °C

- W. Kai, Y.H. Wu (Keelung, Taiwan, ROC), I.F. Jen (Tainan City, Taiwan, ROC), T.H. Ho (Keelung, Taiwan, ROC) and H.H. Hsieh (Hsin-Chu, Taiwan, ROC) ..... S24

## Effect of stress states on the deformation behavior of Cu-based bulk metallic glass in the supercooled liquid region

- E.S. Park (Ames, USA), H.J. Kim, J.C. Bae (Inchon, Republic of Korea) and M.Y. Huh (Seoul, Republic of Korea) ..... S31

Effects of shot peening on the nanoindentation response of Cu<sub>47.5</sub>Zr<sub>47.5</sub>Al<sub>5</sub> metallic glass

- J. Fornell (Bellaterra, Spain), A. Concstell (Barcelona, Spain), A.L. Greer (Cambridge, United Kingdom), S. Suriñach (Bellaterra, Spain), M.D. Baró (Barcelona, Spain) and J. Sort (Bellaterra, Spain) ..... S36

## Primary precipitation phase with β-Mn structure in FeSiBP base multicomponent metallic glasses

- N.B. Dyakonova, D.L. Dyakonov and I.V. Lyasotsky (Moscow, Russia) ..... S41

## Effect of Tb addition on the thermal stability, glass-forming ability and magnetic properties of Fe–B–Si–Nb bulk metallic glass

- J.W. Li, A.N. He and B.L. Shen (Zhejiang, China) ..... S46

## Tool geometry effect on the characteristics of dissimilar friction stir spot welded bulk metallic glass to lightweight alloys

- H.-S. Shin (Kyungbuk, Republic of Korea) ..... S50

**Mechanical alloying and mechanochemistry**

## Mechanical alloying of nanocrystalline intermetallic compound TiFe doped by aluminum and chromium

- V.Yu. Zadorozhnyy, S.N. Klyamkin, M.Yu. Zadorozhnyy, O.V. Bermesheva and S.D. Kaloshkin (Moscow, Russia) ..... S56

## The effect of deformation treatment on the decomposition of supersaturated Ni(Nb,B) and Ni(Mo,B) solid solutions synthesized by mechanical alloying

- L.M. Kubalova (Vladikavkaz, Russia) and V.I. Fadeeva (Moscow, Russia) ..... S61

## Mechanosynthesis of Fe–NbC nanocomposite

- K.A. Yazovskikh and S.F. Lomayeva (Izhevsk, Russia) ..... S65

## Dispersion of silicon carbide nanoparticles in a AA2024 aluminum alloy by a high-energy ball mill

- C. Carreño-Gallardo, I. Estrada-Guel, C. López-Meléndez and R. Martínez-Sánchez (Chihuahua, México) ..... S68

Influence of mechanical alloying conditions on amorphous phase formation in Fe<sub>67</sub>B<sub>33</sub>

- T.A. Sviridova, E.V. Shelekhov, V.I. Bazilyan, T.R. Chueva, N.V. Shvyndina and N.P. Dyakonova (Moscow, Russia) ..... S73

Influence of TiB<sub>2</sub> particle size on the microstructure and properties of Al matrix composites prepared via mechanical alloying and pressureless sintering

- Ö. Balci, D. Ağaoğulları, H. Gökcé, İ. Duman and M.L. Öveçoğlu (İstanbul, Turkey) ..... S78

Effect of process parameters on micro and macro-properties of an Al-based nanocomposite prepared by means of mechanical milling I. Estrada-Guel, C. Carreño-Gallardo, C. Leyva-Porras and R. Martínez-Sánchez (Chihuahua, Mexico).....	S85
Structure and magnetic properties of $Gd_xY_{1-x}FeO_3$ obtained by mechanosynthesis A.M. Bolarín-Miró, F. Sánchez-De Jesús (Hidalgo, Mexico), C.A. Cortés-Escobedo (Distrito Federal, Mexico), R. Valenzuela (México, Mexico) and S. Ammar (Paris Cedex, France) .....	S90
Microstructure and mechanical properties of a Mg–Zn–Y alloy produced by a powder metallurgy route H. Asgharzadeh (Tabriz, Iran), (Pohang, South Korea), E.Y. Yoon (Pohang, South Korea), H.J. Chae, T.S. Kim (Incheon, South Korea), J.W. Lee (Changwon, South Korea) and H.S. Kim (Pohang, South Korea) .....	S95
The effect of V, $VCl_3$ and VC catalysts on the $MgH_2$ hydrogen sorption properties M.O.T. da Conceição, M.C. Brum and D.S. dos Santos (Rio de Janeiro, Brazil) .....	S101
<b>Rapidly quenched and metastable materials</b>	
Corrosion resistance of Fe-based amorphous alloys W.J. Botta (Saint Martin d'Hères, France), (São Carlos, Brazil), J.E. Berger, C.S. Kiminami (São Carlos, Brazil), V. Roche, R.P. Nogueira (Saint Martin d'Hères, France) and C. Bolfarini (São Carlos, Brazil) .....	S105
Rapid solidification of silver-rich Ag–Cu–Zr–Al alloys A. Castellero (Torino, Italy), G. Angella, M. Vedani (Milano, Italy) and M. Baricco (Torino, Italy) .....	S111
Nanoporous gold by dealloying of an amorphous precursor P. Rizzi, F. Scaglione and L. Battezzati (Torino, Italy) .....	S117
Structure of melt-spun Fe–Cu–Si–B–Nb alloy T. Koziel (Cracow, Poland), J. Latuch (Warsaw, Poland) and S. Kac (Cracow, Poland) .....	S121
Nanocrystallization in $Fe_{75}Mo_{2.5}Mn_{2.5}Si_6B_{14}$ amorphous alloy S. Mudry, Yu. Kulyk and S. Zhovneruk (Lviv, Ukraine) .....	S126
AC charging/discharging of de-alloyed Si–Al–V alloy ribbons M. Fukuhara and H. Yoshida (Sendai, Japan) .....	S130
Fabrication of nanoporous copper by dealloying of amorphous Ti–Cu–Ag alloys Z. Dan, F. Qin, A. Makino, Y. Sugawara, I. Muto and N. Hara (Sendai, Japan) .....	S134
<b>Fabrication and processing methods</b>	
Microstructure and mechanical properties of a spray formed and extruded AA7050 recycled alloy H.A. Godinho, A.L.R. Beletti, E.J. Giordano and C. Bolfarini (São Carlos, Brazil) .....	S139
Experimental investigation of diffusion behavior between molten Mg and Nd–Fe–B magnets H.J. Chae (Incheon, Seoul, Republic of Korea), Y.D. Kim (Seoul, Republic of Korea), B.S. Kim, J.G. Kim and T.-S. Kim (Incheon, Republic of Korea) .....	S143
Observation of melt puddle behavior in planar flow casting in air R. Seino and Y. Sato (Sendai, Japan) .....	S150
<b>Structure and structure characterization</b>	
On the state of boride precipitates in grain refined TiAl-based alloys with high Nb content A.V. Kartavykh, M.V. Gorshenkov, V.V. Tcherdyntsev and D.A. Podgorny (Moscow, Russia) .....	S153
Modification of metastable microstructure of CPM15V steel by heat exposure after treatment in semi-solid state F. Vancura, B. Mašek, D. Aišman, H. Jirková (Pilsen, Czech Republic), M.F. Wagner and M. Böhme (Chemnitz, Germany) .....	S159
Microstructure of tool steel upon combined semi-solid processing and thermomechanical treatment B. Mašek, D. Aišman and H. Jirková (Pilsen, Czech Republic) .....	S165
Electron microscopy investigation of interface between carbon fiber and ultra high molecular weight polyethylene A.A. Stepashkin, D.I. Chukov, M.V. Gorshenkov, V.V. Tcherdyntsev and S.D. Kaloshkin (Moscow, Russia) .....	S168
The effect of dual $Fe^+/He^+$ ion beam irradiation on microstructural changes in FeCrAl ODS alloys C.-L. Chen (Hualien, Taiwan), A. Richter (Wildau, Germany) and R. Kögler (Dresden, Germany) .....	S173
Microstructure engineering of TiAl-based refractory intermetallics within power-down directional solidification process A.V. Kartavykh, V.V. Tcherdyntsev, M.V. Gorshenkov and S.D. Kaloshkin (Moscow, Russia) .....	S180
Investigation of AgAlCuZr amorphous/crystalline structure produced by casting and milling K. Tomolya, D. Janovszky, A. Sycheva, M. Benke, Cs. Erdőhegyi and A. Roósz (Miskolc-Egyetemvaros, Hungary) .....	S184
Atomic structure and magnetic properties of Fe–Nb–B metallic glasses I. Kaban (Dresden, Germany), P. Jóvári (Budapest, Germany), A. Waske, M. Stoica (Dresden, Germany), J. Bednarčík (Hamburg, Germany), B. Beuneu (Gif sur Yvette Cedex, France), N. Mattern and J. Eckert (Dresden, Germany) .....	S189
Liquid separation in Cu–Zr–Ag ternary alloys D. Janovszky, K. Tomolya, A. Sycheva, P. Pekker and A. Roósz (Miskolc-Egyetemvaros, Hungary) .....	S194
Structural and phase evolution in laser treatment of $Al_2O_3$ – $TiO_2$ – $Y_2O_3$ powder mixtures M. Vlasova, M. Kakazey, P.A. Márquez Aguilar (Cuernavaca, Mexico), V. Stetsenko, A. Bykov and S. Lakiza (Kiev, Ukraine) .....	S199
<b>Mechanical properties</b>	
Effect of differential speed rolling strain on microstructure and mechanical properties of nanostructured 5052 Al alloy Loorentz and Y.G. Ko (Gyeongsan, South Korea) .....	S205

Diffusional creep in Cu–Fe solid solutions S. Zhevnenko (Moscow, Russia) . . . . .	S210
Comparison of shape memory effect in UHMWPE for bulk and fiber state A. Maksimkin, S. Kaloshkin, M. Zadorozhnyy and V. Tcherdyntsev (Moscow, Russia) . . . . .	S214
<b>Phase transformations</b>	
Phase transitions and magnetic properties of Ni(Co)–Mn–Al melt-spun ribbons M. Lyange, V. Khovaylo (Moscow, Russia), R. Singh, S.K. Srivastava, R. Chatterjee (New-Delhi, India) and L.K. Varga (Budapest, Hungary) . . . . .	S218
Amorphous–crystalline $Ti_2NiCu$ alloy rapidly quenched ribbons annealed by DSC and electric pulses S.P. Belyaev, N.N. Resnina (St. Petersburg, Russia), A.V. Irzhak, V.V. Istomin-Kastrovsky, V.V. Koledov, D.S. Kuchin, V.G. Shavrov (Moscow, Russia), P. Ari-Gur (Kalamazoo, USA), A.V. Shelyakov and N.Yu. Tabachkova (Moscow, Russia) . . . . .	S222
Structural and phase transformations in the low-temperature annealed amorphous “finemet”-type microwires V.V. Tcherdyntsev, A.A. Aleev, M.N. Churyukanova, S.D. Kaloshkin (Moscow, Russia), E.V. Medvedeva (Yekaterinburg, Russia), O.A. Korchuganova (Moscow, Russia), V. Zhukova (San Sebastian, Spain) and A.P. Zhukov (San Sebastian, Bilbao, Spain) . . . . .	S225
Phase composition, structure and mechanical properties of PSZ (partially stabilized zirconia) crystals as a function of stabilizing impurity content M.A. Borik, V.T. Bublik, A.V. Kulebyakin, E.E. Lomonova, F.O. Milovich, V.A. Myzina, V.V. Osiko and N.Y. Tabachkova (Moscow, Russia) . . . . .	S231
<b>Theory and modeling</b>	
Insight into plasticity mechanisms in metallic glasses by means of a Brazilian test and numerical simulation J.S. Brest (Lorient Cedex, Toulouse Cedex, France), V. Kervyn (Lorient Cedex, France), P. Longère (Toulouse Cedex, France) and Y. Yokoyama (Miyagi Prefecture, Japan) . . . . .	S236
Structural transformations at high pressure in the refractory metals (Ta, Mo, V) O.M. Krasilnikov, Yu.Kh. Vekilov, A.V. Lugovskoy, I.Yu. Mosyagin, M.P. Belov and N.G. Bondarenko (Moscow, Russia) . . . . .	S242
Modeling of laser radiation transport in powder beds with high-dispersive metal particles E. Kharanzhevskiy and S. Kostenkov (Izhevsk, Russia) . . . . .	S246
Molecular dynamics computation of the dynamical structure factor of a Lennard–Jones glass: Propagation of acoustic modes at the nm-scale A. Vallés (Castelldefels, Spain), P. Derlet (Villigen, Switzerland), D. Crespo and E. Pineda (Castelldefels, Spain) . . . . .	S250
Temperature rise during differential speed rolling R.B. Megantoro, Loorentz and Y.G. Ko (Gyeongsan, South Korea) . . . . .	S254
$A^{III}B^V$ heterostructure simulation and investigation O.I. Rabinovich (Moscow, Russian Federation) . . . . .	S258
Simulation of shear banding in bulk metallic glass composites containing dendrite phases H.Y. Zhang and G.P. Zheng (Kowloon, Hong Kong) . . . . .	S262
Numerical modeling of power-down directional solidification process of Ti–46Al–8Nb refractory alloy A.V. Kartavykh (Moscow, Russia), V.P. Ginkin and S.M. Ganina (Obninsk, Russia) . . . . .	S267
Effect of Re content on elastic properties of B2 NiAl from <i>ab initio</i> calculations A.V. Ponomareva, Yu.Kh. Vekilov (Moscow, Russia) and I.A. Abrikosov (Linköping, Sweden) . . . . .	S274
<b>Magnetism and magnetic materials</b>	
Giant magnetoimpedance in thin amorphous wires: From manipulation of magnetic field dependence to industrial applications A. Zhukov (San Sebastián, Bilbao, Spain), M. Ipatov (San Sebastián, Spain), M. Churyukanova, S. Kaloshkin (Moscow, Russia) and V. Zhukova (San Sebastián, Spain) . . . . .	S279
Fast magnetization switching in Fe-rich amorphous microwires: Effect of magnetoelastic anisotropy and role of defects V. Zhukova, J.M. Blanco (San Sebastian, Spain), V. Rodionova (San Sebastian, Spain), (Moscow, Russia), M. Ipatov (San Sebastian, Spain) and A. Zhukov (San Sebastian, Bilbao, Spain) . . . . .	S287
Structure and magnetic properties of Fe–Cr–Co nanocrystalline alloys for permanent magnets O.A. Ushakova, E.H. Dinislamova, M.V. Gorshenkov and D.G. Zhukov (Moscow, Russia) . . . . .	S291
Effect of P addition on the structure and magnetic properties of melt-spun Fe–Pt–B alloy W. Zhang (Dalian, China), (Sendai, Japan), A. Kazahari, K. Yubuta, A. Makino (Sendai, Japan), Y. Wang (Dalian, China), (Sendai, Japan), R. Umetsu (Sendai, Japan) and Y. Li (Dalian, China) . . . . .	S294
Investigation of structure and magnetic properties of nanocrystalline iron oxide powders for use in magnetic fluids N.V. Lukashova, A.G. Savchenko, Yu.D. Yagodkin, A.G. Muradova and E.V. Yurtov (Moscow, Russia) . . . . .	S298
Magnetic transition induced by mechanical deformation in $Fe_{60}Al_{40-x}Si_x$ ternary alloys E. Legarra, E. Apiñaniz, F. Plazaola (Bilbao, Spain) and J.A. Jimenez (Madrid, Spain) . . . . .	S301
Influence of glass particles incorporation on the microstructure and magnetic properties of Fe-6.5wt% Si alloy subjected to metal injection molding technique D.Y. Choi, S. Husein and Y.G. Ko (Gyeongsan, South Korea) . . . . .	S305
Effect of replacing RE and TM on magnetic properties and thermal stability of some Al–Ni-based amorphous alloys S.A. Uporov, N.S. Uporova, V.A. Bykov, T.V. Kulikova and S.V. Pryanichnikov (Ekaterinburg, Russia) . . . . .	S310
Effects of order–disorder reactions on rapidly quenched Fe–6.5%Si alloy C.C. Lima, M.C.A. da Silva, M.D.C. Sobral, R.E. Coelho and C. Bolfarini (Brazil) . . . . .	S314

Design of high-coercivity epitaxial magnetic garnet films for thermomagnetic recording and nanotechnology V.G. Kostishyn, A.T. Morchenko and D.N. Chitanov (Moscow, Russian Federation).....	S317
NiO core-shell nanostructure with ferromagnetic-like behavior at room temperature M. Tadic (Belgrade, Serbia), M. Panjan (Ljubljana, Slovenia), D. Markovic, B. Stanojevic, D. Jovanovic (Belgrade, Serbia), I. Milosevic (Orléans Cedex, Bobigny Cedex, France) and V. Spasojevic (Ljubljana, Slovenia) .....	S322
<b>Thin films and coating</b>	
Characterisations of CoFeCu films: Influence of Fe concentration H. Kockar, E. Ozergin, O. Karaagac (Cagis, Turkey) and M. Alper (Gorukle, Turkey) .....	S326
Novel spongelike nanostructured ZnO films: Properties and applications R. Gazia, G. Canavese, A. Chiodoni, A. Lamberti, S. Stassi, A. Sacco, S. Bianco, A. Virga, E. Tresso and C.F. Pirri (Torino, Italy).....	S331
Piezoelectric properties and surface potential behavior in LiNbO <sub>3</sub> thin films grown by the radio frequency magnetron sputtering R.N. Zhukov, A.S. Bykov, D.A. Kiselev, M.D. Malinkovich and Yu.N. Parkhomenko (Leninskiy, Russia).....	S336
Epitaxial growth of Sb-doped nonpolar <i>a</i> -plane ZnO thin films on <i>r</i> -plane sapphire substrates by RF magnetron sputtering H.-G. Chen and S.-P. Hung (Kaohsiung, Taiwan) .....	S339
Crystal structure and surface morphology of magnetron sputtering deposited hexagonal and perovskite-like YbMnO <sub>3</sub> thin films N.V. Andreev, T.A. Sviridova, V.I. Chichkov (Moscow, Russia), A.P. Volodin, C. Van Haesendonck (Leuven, Belgium) and Ya.M. Mukovskii (Moscow, Russia) .....	S343
Low resistivity Fe-Co-B-Ti-Nb amorphous thin film as a copper barrier J.-S. Fang, L.-C. Yang and Y.-C. Lee (Yunlin, Taiwan) .....	S348
AC/DC conductance in granular nanocomposite films (Fe <sub>45</sub> Co <sub>45</sub> Zr <sub>10</sub> ) <sub>x</sub> (CaF <sub>2</sub> ) <sub>100-x</sub> T.N. Koltunowicz, P. Zukowski (Lublin, Poland), M. Milosavljević (Belgrade, Serbia), A.M. Saad (Salt, Jordan), J.V. Kasiuk, J.A. Fedotova (Minsk, Belarus), Yu.E. Kalinin, A.V. Sitnikov (Voronezh, Russia) and A.K. Fedotov (Minsk, Belarus) .....	S353
Influence of voltage waveform on anodic film of AZ91 Mg alloy via plasma electrolytic oxidation: Microstructural characteristics and electrochemical responses Y.G. Ko (Gyeongsan, South Korea), E.S. Lee and D.H. Shin (Ansan, South Korea) .....	S357
Influence of Al addition on phase transformation and thermal stability of nickel silicides on Si(001) S.-H. Huang, S.-C. Twan, S.-L. Cheng, T. Lee (Jhong-Li, Taiwan, ROC), J.-C. Hu, L.-T. Chen (Hsinchu, Taiwan, ROC) and S.-W. Lee (Jhong-Li, Taiwan, ROC) .....	S362
Production and characterization of Tm <sup>3+</sup> /Yb <sup>3+</sup> codoped waveguides based on PbO-GeO <sub>2</sub> thin films T.A.A. de Assumpção, D.M. da Silva, V.D. Del Cacho, L.R.P. Kassab and M.I. Alayo (São Paulo, Brazil) .....	S368
Formation of intermetallic Ni-Al coatings by mechanical alloying on the different hardness substrates V. Zadorozhnyy, S. Kaloshkin, V. Tcherdyntsev, M. Gorshenkov, A. Komissarov and M. Zadorozhnyy (Moscow, Russia) .....	S373
Deformation-induced alloying of Cu sheet with Al using ball collisions I.V. Shchetinin (Moscow, Russia), J.M. Yoon and S. Romankov (Jeonju, South Korea) .....	S377
Investigation of structure and phase formation in multilayer coatings and their thermal stability I.V. Blinkov, A.O. Volkhonskii, D.V. Kuznetsov and E.A. Skryleva (Moscow, Russian Federation) .....	S381
A study of the deposition process of multilayer coatings on the inner tube surface with the pulsed laser deposition technique A.A. Lozovan, S.S. Alexandrova, M.A. Mishnev and S.V. Prishepov (Moscow, Russia) .....	S387
<b>Quasicrystals</b>	
Decagonal quasicrystalline phase in as-cast and mechanically alloyed Al-Cu-Cr alloys A.P. Shevchukov, T.A. Sviridova, S.D. Kaloshkin, V.V. Tcherdyntsev, M.V. Gorshenkov, M.N. Churyukanova (Moscow, Russia), D. Zhang and Z. Li (Shanghai, China) .....	S391
Effect of Mo on stability of quasicrystalline phase in Al-Mn-Fe alloy K. Stan, L. Lityńska-Dobrzyńska (Reymonta St., Poland), J.L. Lábár (Konkoly-Thege ut 29-33, Hungary) and A. Góral (Reymonta St., Poland) S395	
<b>Bulk nanostructured materials</b>	
Hydrogen sorption properties of nanostructured bulk Mg <sub>2</sub> Ni intermetallic compound V. Yu Zadorozhnyy, M. Menjo (Sendai, Japan), M. Yu Zadogozhnyy, S.D. Kaloshkin (Moscow, Russia) and D.V. Louguine-Luzgin (Sendai, Japan) .....	S400
Hydrogen storage properties of pure Mg after the combined processes of ECAP and cold-rolling G.F. Lima, M.R.M. Triques, C.S. Kiminami, W.J. Botta and A.M. Jorge Jr. (São Carlos, Brazil) .....	S405
Hydrogen storage properties of 2Mg-Fe after the combined processes of hot extrusion and cold rolling G.F. Lima, M.R.M. Triques, C.S. Kiminami, W.J. Botta and A.M. Jorge Jr. (São Carlos, Brazil) .....	S409
Nonmonotonic change in the structural grain size of the Bi <sub>0.4</sub> Sb <sub>1.6</sub> Te <sub>3</sub> thermoelectric material synthesised by spark plasma sintering V.B. Osvenskiy, V.P. Panchenko, Yu.N. Parkhomenko, A.I. Sorokin, D.I. Bogomolov, V.T. Bublik and N.Yu. Tabachkova (Moscow, Russia) ..	S413
Tensile properties of Al matrix composites reinforced with <i>in situ</i> devitrified Al <sub>84</sub> Gd <sub>6</sub> Ni <sub>7</sub> Co <sub>3</sub> glassy particles Z. Wang (Dresden, Germany), (Guangzhou, China), K.G. Prashanth, S. Scudino, A.K. Chaubey (Dresden, Germany), D.J. Sordelet (Mossville, USA), W.W. Zhang, Y.Y. Li (Guangzhou, China) and J. Eckert (Dresden, Germany) .....	S419

## Nanocomposites

Effect of reinforcement particle size on microstructure and mechanical properties of AlZnMgCu/AlN nano-composites produced using mechanical alloying	S423
M. Gajewska, J. Dutkiewicz and J. Morgiel (Krakow, Poland) . . . . .	S423
Thermoelectric properties of n-type 95%Bi <sub>2</sub> Te <sub>3</sub> -5%Bi <sub>2</sub> Se <sub>3</sub> compounds fabricated by gas-atomization and spark plasma sintering	S428
H.-S. Kim and S.-J. Hong (Chungnam, South Korea) . . . . .	S428
Correlation between local Fe states and magnetoresistivity in granular films containing FeCoZr nanoparticles embedded into oxygen-free dielectric matrix	
J.V. Kasiuk, J.A. Fedotova (Minsk, Belarus), T.N. Koltunowicz, P. Zukowski (Lublin, Poland), A.M. Saad (Salt, Jordan), J. Przewoznik, Cz. Kapusta, J. Zukrowski (Krakow, Poland) and I.A. Svito (Minsk, Belarus) . . . . .	S432
Study of adsorption properties of functionalized nanodiamonds in aqueous solutions of metal salts using optical spectroscopy	
T.A. Dolenko, S.A. Burikov, K.A. Laptinskiy, T.V. Laptinskaya (Moscow, Russia), J.M. Rosenholm (Turku, Finland), A.A. Shiryaev, A.R. Sabirov and I.I. Vlasov (Moscow, Russia) . . . . .	S436
Thermal conductivity of polypropylene-based composites with multiwall carbon nanotubes with different diameter and morphology	
I.N. Mazov (Moscow, Novosibirsk, Russian Federation), I.A. Ilinykh (Moscow, Russian Federation), V.L. Kuznetsov (Novosibirsk, Russian Federation), A.A. Stepashkin, K.S. Ergin, D.S. Muratov, V.V. Tcherdyntsev, D.V. Kuznetsov (Moscow, Russian Federation) and J.-P. Issi (Louvain-La-Neuve, Belgium) . . . . .	S440
Structure, mechanical and tribological properties of radiation cross-linked ultrahigh molecular weight polyethylene and composite materials based on it	
V.V. Tcherdyntsev, S.D. Kaloshkin, A.A. Lunkova, A.M. Musalitin, V.D. Danilov, Yu.V. Borisova, A.A. Boykov and V.A. Sudarchikov (Moscow, Russia) . . . . .	S443
Development of antifriction composites based on polypyromellitimide matrix	
L.K. Olfirov, S.D. Kaloshkin, V.V. Tcherdyntsev and V.D. Danilov (Russia) . . . . .	S446
Thermal conductivity of polypropylene filled with inorganic particles	
D.S. Muratov, D.V. Kuznetsov, I.A. Il'inykh, I.N. Mazov, A.A. Stepashkin and V.V. Tcherdyntsev (Moscow, Russia) . . . . .	S451
Photons transport through ultra-high molecular weight polyethylene based composite containing tungsten and boron carbide fillers	
S.M. Ivanov, S.A. Kuznetsov, A.E. Volkov, P.N. Terekhin, S.V. Dmitriev, V.V. Tcherdyntsev, M.V. Gorshenkov and A.A. Boykov (Moscow, Russia) . . . . .	S455
Surface modification of carbon fibers and its effect on the fiber-matrix interaction of UHMWPE based composites	
D.I. Chukov, A.A. Stepashkin, M.V. Gorshenkov, V.V. Tcherdyntsev and S.D. Kaloshkin (Moscow, Russia) . . . . .	S459
Development of laminated nanocomposites on the bases of magnetic and non-magnetic shape memory alloys: Towards new tools for nanotechnology	
A. Irzhak, V. Koledov, D. Zakharov, G. Lebedev, A. Mashirov, V. Afonina, K. Akatyeva, V. Kalashnikov, N. Sitnikov, N. Tabachkova, A. Shelyakov and V. Shavrov (Moscow, Russia) . . . . .	S464
X-ray studies of nanostructured Ti <sub>2</sub> NiCu shape memory alloy	
P. Ari-Gur, A.S.B. Madiligama, S.G. Watza (Kalamazoo, USA), A. Shelyakov, D. Kuchin, V. Koledov (Moscow, Russia) and W. Gao (New Zealand) . . . . .	S469

## Nanopowders and nanoparticles

Synthesis and luminescent properties of MgAl <sub>2</sub> O <sub>4</sub> :Eu nanopowders	
I.V. Beketov, A.I. Medvedev, O.M. Samatov, A.V. Spirina and K.I. Shabanova (Ekaterinburg, Russia) . . . . .	S472
Synthesis and characterization of rod-like ZnO decorated with $\gamma$ -Fe <sub>2</sub> O <sub>3</sub> nanoparticles monolayer	
I. Balti (Jarzouna, Tunisia), (Villetaneuse, France), L.S. Smiri (Jarzouna, Tunisia), P. Rabu (Strasbourg Cedex, France), E. Gautron (Nantes Cedex, France), B. Viana (Paris, France) and N. Jouini (Villetaneuse, France) . . . . .	S476
In situ modification of Fe and Ni magnetic nanopowders produced by the electrical explosion of wire	
I.V. Beketov, A.P. Safronov, A.V. Bagazeev (Ekaterinburg, Russia), A. Larrañaga (Bilbao, Spain), G.V. Kurlyandskaya (Ekaterinburg, Russia), (Bilbao, Spain) and A.I. Medvedev (Ekaterinburg, Russia) . . . . .	S483
Microstructural characterisation of Ni <sub>75</sub> Al <sub>25</sub> and Ni <sub>31.5</sub> Al <sub>68.5</sub> powder particles produced by gas atomisation	
A. García-Escorial and M. Lieblich (Madrid, Spain) . . . . .	S489
Modified amorphous layered titanates as precursor materials to produce heterostructured nanopowders and ceramic nanocomposites	
A.V. Gorokhovsky (Saratov, Russia), (Coahuila, Mexico), E.V. Tretyachenko (Saratov, Russia), J.I. Escalante-Garcia (Coahuila, Mexico), G.Yu. Yurkov and V.G. Goffman (Saratov, Russia) . . . . .	S494
Synthesis, characterization and high temperature CO <sub>2</sub> capture capacity of nanoscale Ca-based layered double hydroxides via reverse microemulsion	
P.-H. Chang, Y.-P. Chang, Y.-H. Lai, S.-Y. Chen (Hsinchu, Taiwan), C.-T. Yu and Y.-P. Chyou (Longtan, Taiwan) . . . . .	S498
Synthesis and characterization of Ba <sub>0.6</sub> Sr <sub>0.4</sub> Ce <sub>0.8-x</sub> Zr <sub>x</sub> Y <sub>0.2</sub> O <sub>3-x</sub> proton-conducting oxides for use as fuel cell electrolyte	
S.-W. Lee, C.-J. Tseng, J.-K. Chang, K.-R. Lee, C.-T. Chen, I.-M. Hung, S.-L. Lee and J.-C. Lin (Taiwan) . . . . .	S506
Catalytic properties of nickel ferrites for oxidation of glucose, $\beta$ -nicotiamide adenine dinucleotide (NADH) and methanol	
R. Galindo (Guanajuato, Mexico), (Madrid, Spain), S. Gutiérrez (Guanajuato, Mexico), N. Menéndez and P. Herrasti (Madrid, Spain) . . . . .	S511
Frequency upconversion in Nd <sup>3+</sup> doped PbO-GeO <sub>2</sub> glasses containing silver nanoparticles	
D.S. da Silva, T.A.A. de Assumpção, L.R.P. Kassab (São Paulo, Brazil) and C.B. de Araújo (Recife, Brazil) . . . . .	S516
Highly efficient removal of arsenic metal ions with high superficial area hollow magnetite nanoparticles synthetized by AACVD method	
B. Monárez-Cordero, P. Amézaga-Madrid, W. Antúnez-Flores, C. Leyva-Porras, P. Pizá-Ruiz and M. Miki-Yoshida (Chihuahua, Mexico) . . . . .	S520

Optical properties of bio-inspired silver sulfide structures I. Martínez-Ruvalcaba, J.F. Hernández-Paz, J.R. Fariás Mancilla, P. Piza Ruiz, C.A. Martínez Pérez, P.E. García-Casillas and C.A. Rodríguez-González (Chihuahua, Mexico) . . . . .	S526
<b>Biomaterials and applications</b>	
Electrophoretic deposition of composite halloysite nanotube–hydroxyapatite–hyaluronic acid films I. Deen and I. Zhitomirsky (Ontario, Canada). . . . .	S531
Characterization of electrochemical behavior and surface oxide films on superelastic biomedical Ti–Nb–Ta alloy in simulated physiological solutions Y.S. Zhukova, Y.A. Pustov, A.S. Konopatsky and M.R. Filonov (Moscow, Russian Federation) . . . . .	S535
Evaluation of Ni-free Zr–Cu–Fe–Al bulk metallic glass for biomedical implant applications Y.-S. Sun (Taipei, Taiwan), W. Zhang (Dalian, China), W. Kai (Keelung, Taiwan), P.K. Liaw (Knoxville, USA) and H.-H. Huang (Taipei, Taiwan)	S539
Biocompatible polymer composites based on ultrahigh molecular weight polyethylene perspective for cartilage defects replacement F.S. Senatov, M.V. Gorshenkov, S.D. Kaloshkin, V.V. Tcherdyntsev, N.Yu. Anisimova, A.N. Kopylov and M.V. Kiselevsky (Moscow, Russian Federation) . . . . .	S544
Surface characteristics and biological response of titanium oxide layer formed via micro-arc oxidation in $K_3PO_4$ and $Na_3PO_4$ electrolytes Y.C. Jung, K.R. Shin (Ansan, South Korea), Y.G. Ko (Gyeongsan, South Korea) and D.H. Shin (Ansan, South Korea) . . . . .	S548
<b>Technological applications</b>	
Monolithic ionizing particle detector based on active matrix of functionally integrated structures V.N. Murashev, S.A. Legotin, D.E. Karmanov, F.M. Baryshnikov and S.I. Didenko (Russian Federation) . . . . .	S553
<b>Keywords.</b> . . . . .	III