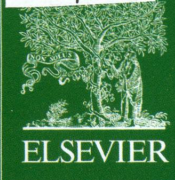


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# JOURNAL OF SOLID STATE CHEMISTRY

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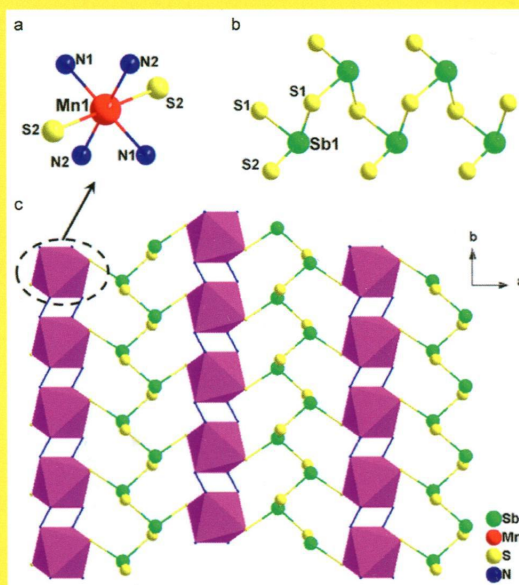
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**Surfactant-thermal method to prepare two novel two-dimensional Mn–Sb–S compounds for photocatalytic applications**



**Lina Nie, Wei-Wei Xiong, Peizhou Li, Jianyu Han, Guodong Zhang, Shengming Yin, Yanli Zhao, Rong Xu and Qichun Zhang**

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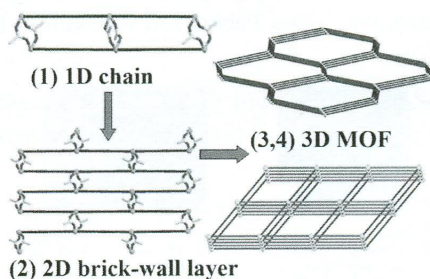
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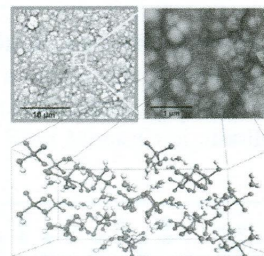
### Regular Articles

**Syntheses, structures and magnetic properties of four coordination polymers based on nitrobenzene dicarboxylate and various N-donor coligands**  
Gui-Lian Li, Wei-Dong Yin, Guang-Zhen Liu, Lu-Fang Ma and Li-Ya Wang  
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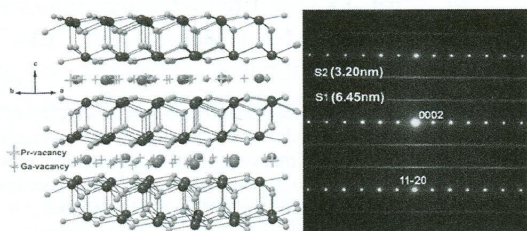
### Regular Articles—Continued

**Characterization of rhenium compounds obtained by electrochemical synthesis after aging process**  
Alejandro Vargas-Uscategui, Edgar Mosquera, Juan M. López-Encarnación, Boris Chornik, Ram S. Katiyar and Luis Cifuentes  
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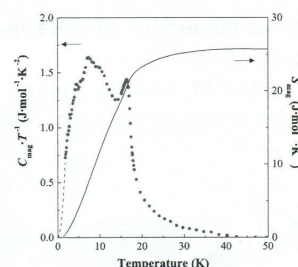
Rhenium oxides were electrodeposited on a copper surface and after environmental aging was formed the  $H(ReO_4)H_2O$  compound. The characterization of the synthesized material was made through the comparison of experimental evidence with quantum mechanical computations carried out by means of density functional theory (DFT).

**$Pr_{1.33}Pt_4Ga_{10}$ : Superstructure and magnetism**  
Sau Doan Nguyen, Kevin Ryan, Ping Chai, Michael Shatruk, Yan Xin, Karena W. Chapman, Peter J. Chupas, Frank R. Fronczek and Robin T. Macaluso  
*page 9*



Left: Crystal structure of  $Pr_{1.33}Pt_4Ga_{10}$  showing Pr and Ga vacancies in the  $Pr_2Ga_3$  plane. Right: Tunneling electron microscopy (TEM) image of  $Pr_{1.33}Pt_4Ga_{10}$ . These vacancies have been studied using TEM and pair distribution function analysis. Magnetic measurements reveal that  $Pr^{3+}$  ions order ferrimagnetically below 7.8(2) K.

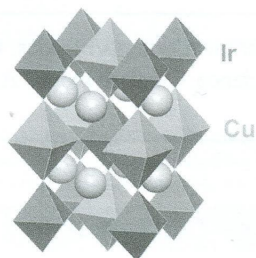
**Structural phase transition and antiferromagnetic transition of  $Tb_3RuO_7$**   
Yukio Hinatsu and Yoshihiro Doi  
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Temperature dependence of the magnetic specific heat divided by temperature ( $C_{mag}/T$ ) and the magnetic entropy ( $S_{mag}$ ) for  $Tb_3RuO_7$ . Two-step magnetic transition has been observed.

## Synthesis, crystal structure and magnetic properties of a new B-site ordered double perovskite Sr<sub>2</sub>CuIrO<sub>6</sub>

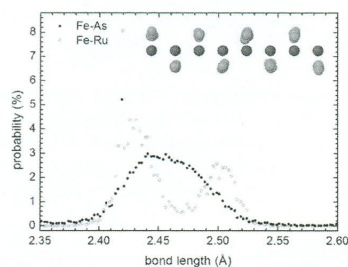
Sami Vasala, Hisao Yamauchi and Maarit Karppinen  
page 28



A new member of the A<sub>2</sub>B'B''O<sub>6</sub> double-perovskite family with JT-active Cu<sup>II</sup> at the B' site and Ir<sup>VI</sup> at the B'' site is synthesized through high pressure synthesis and characterized for the structural and magnetic properties.

## Pair distribution function analysis of La(Fe<sub>1-x</sub>Ru<sub>x</sub>)AsO compounds

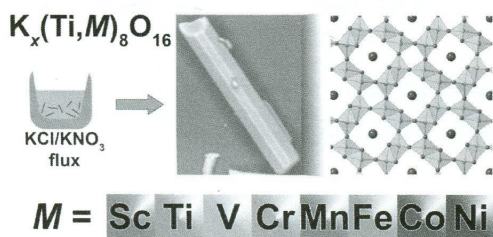
A. Martinelli, A. Palenzona, C. Ferdeghini, M. Mazzani, P. Bonfà and G. Allodi  
page 37



Fe-As and Ru-As bond length distributions as obtained by pair distribution function analysis of La(Fe<sub>0.70</sub>Ru<sub>0.30</sub>)AsO; As atoms (purple spheres) undergo a random shifting around their crystallographic positions (red spheres: Fe/Ru atoms).

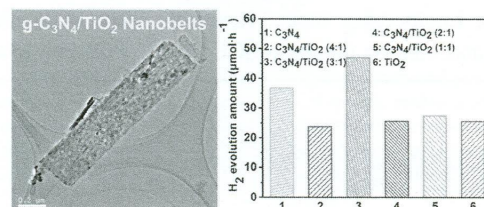
## Synthesis and crystal chemistry of microporous titanates K<sub>x</sub>(Ti,M)<sub>8</sub>O<sub>16</sub> where M=Sc-Ni

Pouya Moetakef, Amber M. Larson, Brenna C. Hodges, Peter Zavalij, Karen J. Gaskell, Philip M. Piccoli and Efrain E. Rodriguez  
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## TiO<sub>2</sub> nanobelts with a uniform coating of g-C<sub>3</sub>N<sub>4</sub> as a highly effective heterostructure for enhanced photocatalytic activities

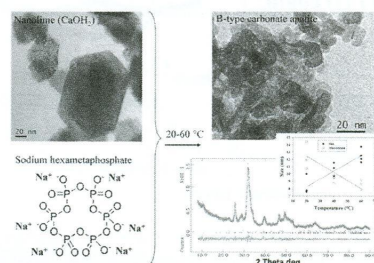
Xing Zhong, Meimei Jin, Huaqing Dong, Lin Liu, Lei Wang, Huiyou Yu, Shuai Leng, Guilin Zhuang, Xiaonian Li and Jian-guo Wang  
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A novel strategy to fabricate the g-C<sub>3</sub>N<sub>4</sub>/TiO<sub>2</sub> nanobelt (NB) heterostructures was reported. The g-C<sub>3</sub>N<sub>4</sub>/TiO<sub>2</sub> NB heterostructures exhibited highly effective photocatalytic activities for photodegradation of Rhodamine B and H<sub>2</sub> production.

## Facile synthesis of B-type carbonated nanoapatite with tailored microstructure

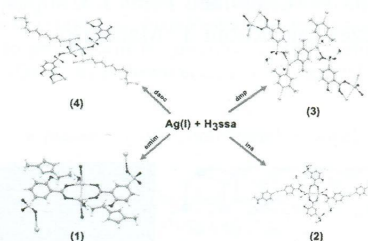
Magdalena Lassinanti Gualtieri, Marcello Romagnoli, Miriam Hanuskova, Elena Fabbri and Alessandro F. Gualtieri  
page 60



Controlled synthesis of carbonated apatite at moderate temperatures using nanolime and sodiumhexametaphosphate as starting reagent.

## One- and three-dimensional silver(I)-5-sulfosalicylate coordination polymers having ligand-supported and unsupported argentophilic interactions

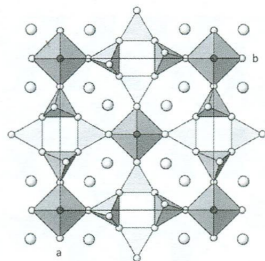
Mürsel Arıcı, Okan Zafer Yeşilel, Yeşim Yeşilöz and Onur Şahin  
page 70



In this study, four new Ag(I)-coordination polymers with 5-sulfosalicylate and some N-donor ligands were synthesized and characterized. Complexes 1 and 2 are one-dimensional (1D) coordination polymers while complexes 3 and 4 are three-dimensional (3D) coordination polymers. Complex 3 consists of three dimensional (3D) 3,3,6-c net with 3,3,6T37 topology. Complex 4 exhibits a 2-fold interpenetrating 3D framework with tfc topology. The complexes 1-4 contain ligand-supported (1-3) and unsupported (4) argentophilic Ag...Ag interactions. Photoluminescence spectra of the complexes demonstrated that photoluminescent properties may be attributed to intraligand transition of coordinated Hssa ligand.

**One-pot occurrence of two polymorphs of  $\text{Rb}_2\text{Sc}[\text{Si}_4\text{O}_{10}]\text{F}$  and their structural, spectroscopic and computational characterization**

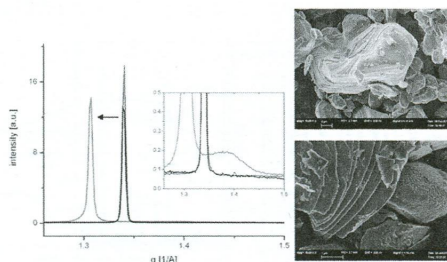
Volker Kahlenberg, Tanja Manninger, Lukas Perfler and Daniel M. Töbrens  
page 79



Mixed tetrahedral–octahedral framework of the tetragonal polymorph of  $\text{Rb}_2\text{Sc}[\text{Si}_4\text{O}_{10}]\text{F}$ .

**Chemical delithiation and exfoliation of  $\text{Li}_x\text{CoO}_2$**

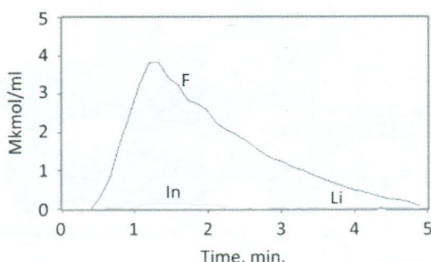
Angelika Basch, Liliana de Campo, Jörg H. Albering and John W. White  
page 102



The effect of chemical dedoping of  $\text{Li}_x\text{CoO}_2$  leads to a significant change in the (003) peak and to exfoliation for  $x=1/3$ .

**Origin of the solid solution in the  $\text{LiInSe}_2\text{--In}_2\text{Se}_3$  system**

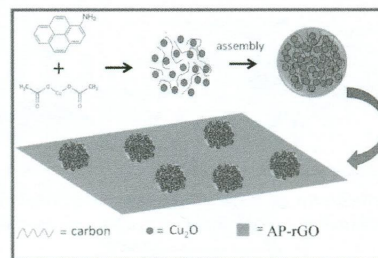
I.G. Vasilyeva, A.A. Pochtar and L.I. Isaenko  
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Differential dissolution technique applied for detection of dispersive precipitates in as-grown  $\text{LiInSe}_2$  single crystals: kinetic curves of the phase dissolution: F is the main phase  $\text{Li}_{0.96}\text{In}_{1.01}\text{Se}_2$  (98.9%), secondary minor phases  $\text{Li}_2\text{Se}$  (0.1%),  $\text{In}_2\text{Se}_3$  (0.9%).

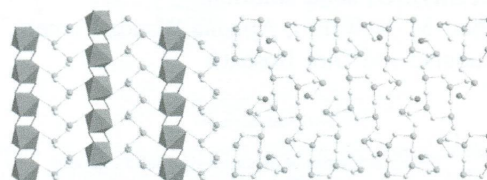
**Sonochemical fabrication of  $\text{Cu}_2\text{O}@C/\text{graphene}$  nanohybrid with a hierarchical architecture**

Jiasheng Xu, Dinh Khoi Dang, Jin Suk Chung, Seung Hyun Hur, Won Mook Choi and Eui Jung Kim  
page 111



**Surfactant-thermal method to prepare two novel two-dimensional Mn–Sb–S compounds for photocatalytic applications**

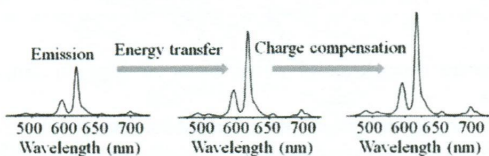
Lina Nie, Wei-Wei Xiong, Peizhou Li, Jianyu Han, Guodong Zhang, Shengming Yin, Yanli Zhao, Rong Xu and Qichun Zhang  
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Two novel 2D framework sulfides,  $[\text{MnSb}_2\text{S}_4(\text{N}_2\text{H}_4)_2]$  (1) and  $[\text{Mn}(\text{tepa})\text{Sb}_6\text{S}_{10}]$  (2) (tepa = tetraethylenepentamine), have been successfully synthesized under surfactant-thermal conditions and show active visible-light-driven photocatalytic properties for hydrogen production.

**Luminescence properties of  $\text{Ca}_3\text{Ti}_2\text{O}_7:\text{Eu}^{3+}, \text{Bi}^{3+}, \text{R}^+$  ( $\text{R}^+=\text{Li}^+, \text{Na}^+, \text{and K}^+$ ) red emission phosphor**

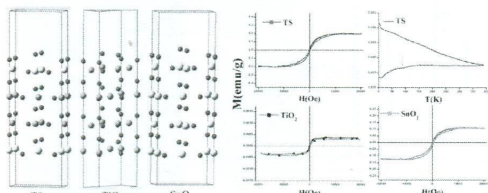
Renping Cao, Guo Chen, Xiaoguang Yu, Chunyan Cao, Kangbin Chen, Pan Liu and Shenhua Jiang  
page 97



Energy transfer and charge compensation can enhance PL intensity of phosphors obviously

**Exploring the structural and magnetic properties of TiO<sub>2</sub>/SnO<sub>2</sub> core/shell nanocomposite: An experimental and density functional study**

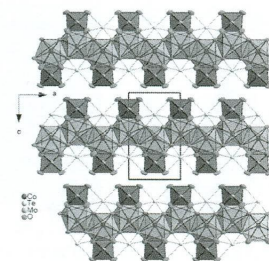
Pawan Chetri, Priyanka Basyach and Amarjyoti Choudhury  
page 124



Above pictorial presentation (from left) represents the model for TS, TiO<sub>2</sub> and SnO<sub>2</sub> used for DFT calculation and the obtained magnetic results for all the prepared systems

**Growth and characterization of nonlinear optical telluromolybdate CoTeMoO<sub>6</sub> single crystals**

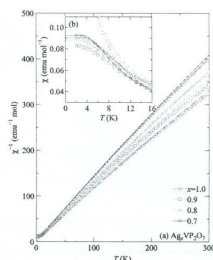
Mirosław Mączka, Krzysztof Hermanowicz, Andrzej Majchrowski, Łukasz Kroenke, Adam Pietraszko and Maciej Ptak  
page 142



View of CoTeMoO<sub>6</sub> crystal structure along the *b*-axis.

**Crystal structure and orbital-singlet state of Ag<sub>x</sub>VP<sub>2</sub>O<sub>7</sub>**

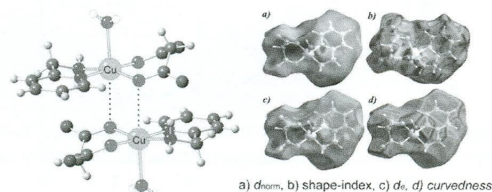
Masashige Onoda and Takuma Sakamoto  
page 132



(a) The temperature dependencies of inverse magnetic susceptibilities for Ag<sub>x</sub>VP<sub>2</sub>O<sub>7</sub> with *x* = 0.7–1 and (b) the low-temperature susceptibilities.

**A combined experimental and theoretical study of the supramolecular self-assembly of Cu(II) malonate complex assisted by various weak forces and water dimer**

Prankrishna Manna, Somnath Ray Choudhury, Monojit Mitra, Saikat Kumar Seth, Madeleine Helliwell, Antonio Bauzá, Antonio Frontera and Subrata Mukhopadhyay  
page 149

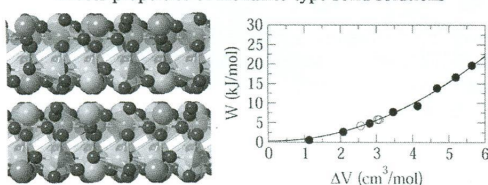


Interplay of weak forces like hydrogen bonding, lone pair...π, Cu...Cu and π-stacking interactions leading to the formation of supramolecular network in [Cu(C<sub>3</sub>H<sub>2</sub>O<sub>4</sub>)(C<sub>6</sub>H<sub>8</sub>N<sub>2</sub>)(H<sub>2</sub>O)]<sub>2</sub>·4H<sub>2</sub>O complex.

**Ab initio calculation of excess properties of La<sub>1-x</sub>(Ln, An)<sub>x</sub>PO<sub>4</sub> solid solutions**

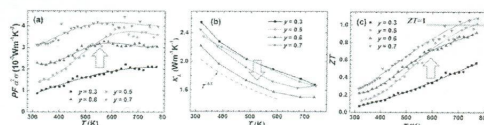
Yan Li, Piotr M. Kowalski, Ariadna Blanca-Romero, Victor Vinograd and Dirk Bosbach  
page 137

Excess properties of monazite-type solid solutions



**Variations of thermoelectric properties of Mg<sub>2.2</sub>Si<sub>1-y</sub>Sn<sub>y-0.13</sub>Sb<sub>0.13</sub> materials with different Si/Sn ratios**

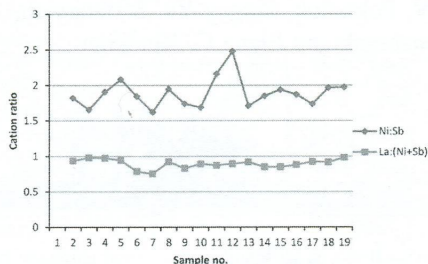
Hongli Gao, Tiejun Zhu, Xinbing Zhao and Yuan Deng  
page 157



(a) Temperature dependence of power factor of Mg<sub>2.2</sub>Si<sub>1-y</sub>Sn<sub>y-0.13</sub>Sb<sub>0.13</sub> samples.  
(b) Temperature dependence of lattice thermal conductivity of Mg<sub>2.2</sub>Si<sub>1-y</sub>Sn<sub>y-0.13</sub>Sb<sub>0.13</sub> samples.  
(c) Temperature dependence of dimensionless figure of merit ZT of Mg<sub>2.2</sub>Si<sub>1-y</sub>Sn<sub>y-0.13</sub>Sb<sub>0.13</sub> samples.

### The interplay of microstructure and magnetism in $\text{La}_3\text{Ni}_2\text{SbO}_9$

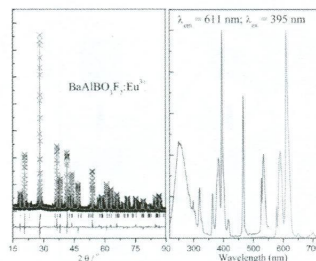
Peter D. Battle, Maxim Avdeev and Joke Hadermann  
page 163



Composition variations across a crystal of  $\text{La}_3\text{Ni}_2\text{SbO}_9$  result in anomalous magnetic behavior.

### Crystal structure and luminescence properties of a novel red-emitting phosphor $\text{BaAlBO}_3\text{F}_2:\text{Eu}^{3+}$

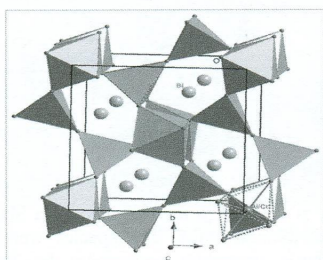
Wanping Chen, Along Zhou, Yan Liu, Xiaoyan Dai and Xin Yang  
page 177



The luminescence behavior and Rietveld refinement of  $\text{BaAlBO}_3\text{F}_2:\text{Eu}^{3+}$  indicate that the red-emitting phosphor has potential application in white LED and the host has a hexagonal structure with  $P-6$  space group.

### Chromium substitution in mullite type bismuth aluminate: $\text{Bi}_2\text{Cr}_x\text{Al}_{4-x}\text{O}_9$ with $0 \leq x \leq 2.0$

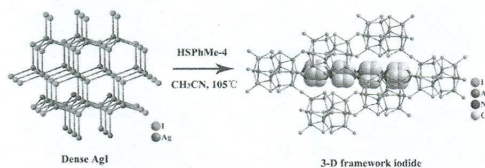
Tapas Debnath, Ahamed Ullah, Claus H. Rüschler and Altaf Hussain  
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Structural model of Cr doped bismuth aluminate,  $\text{Bi}_2\text{Cr}_x\text{Al}_{4-x}\text{O}_9$ .

### Transformation of dense AgI into a silver-rich framework iodide using thiophenol as mineralizer

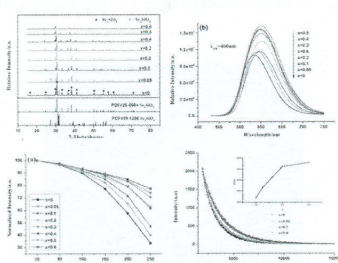
Ren-Chun Zhang, You-Juan Zhang, Bai-Qing Yuan, Jun-Peng Miao, Bao-Hua Pei, Pan-Pan Liu, Jun-Jie Wang and Dao-Jun Zhang  
page 185



A new 3-D iodoargentate was synthesized by transformation of dense AgI in  $\text{I}^-$ -deficient system using thiophenol as mineralizer.

### Enhanced luminescence properties in $(\text{Sr}_{1-x}\text{Ba}_x)_{2.97}\text{SiO}_3\text{N}_{4/3}:0.03\text{Eu}^{2+}$ oxynitride phosphor

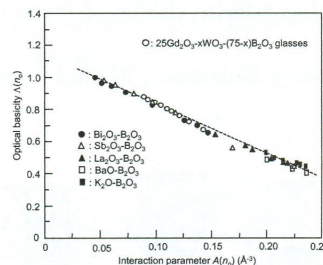
Xia He, Kehui Qiu, Xueguang Lu, Kun Zhao and Zixu Jiang  
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Through the change of micro-structure by doping  $\text{Ba}^{2+}$  ions proved by the XRD patterns,  $(\text{Sr}_{1-x}\text{Ba}_x)_{2.97}\text{SiO}_3\text{N}_{4/3}:0.03\text{Eu}^{2+}$  phosphor eventually achieves the extension of lifetime and the improvement of luminescence properties and thermal stability.

### Electronic polarizability and interaction parameter of gadolinium tungsten borate glasses with high $\text{WO}_3$ content

Yukina Taki, Kenji Shinozaki, Tsuyoshi Honma, Vesselin Dimitrov and Takayuki Komatsu  
page 191

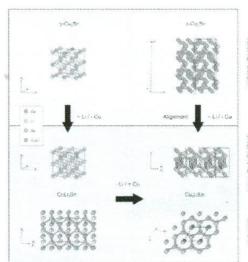


This figure shows the correlation between the optical basicity and interaction parameter in borate-based glasses. The data obtained in the present study for  $\text{Gd}_2\text{O}_3-\text{WO}_3-\text{B}_2\text{O}_3$  glasses are locating in the correlation line for other borate glasses. These results shown in Fig. 8 clearly demonstrate that  $\text{Gd}_2\text{O}_3-\text{WO}_3-\text{B}_2\text{O}_3$  glasses having a wide range of optical basicity and interaction parameter are regarded as glasses consisting of acidic and basic oxides.

Continued

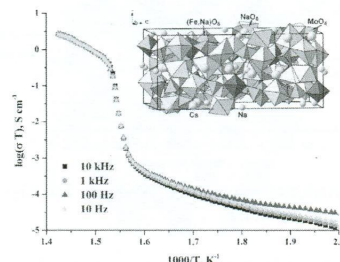
**CuLi<sub>2</sub>Sn and Cu<sub>2</sub>LiSn: Characterization by single crystal XRD and structural discussion towards new anode materials for Li-ion batteries**

Siegfried Fürtauer, Herta S. Effenberger and Hans Flandorfer  
page 198



**Synthesis, crystal structure and properties of alluaudite-like triple molybdate Na<sub>25</sub>Cs<sub>8</sub>Fe<sub>5</sub>(MoO<sub>4</sub>)<sub>24</sub>**

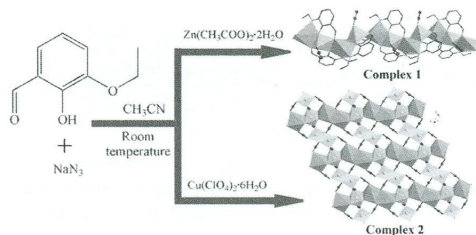
Aleksandra A. Savina, Sergey F. Solodovnikov, Dmitry A. Belov, Olga M. Basovich, Zoya A. Solodovnikova, Konstantin V. Pokholok, Sergey Yu. Stefanovich, Bogdan I. Lazoryak and Elena G. Khaikina  
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A new triple molybdate Na<sub>25</sub>Cs<sub>8</sub>Fe<sub>5</sub>(MoO<sub>4</sub>)<sub>24</sub> was synthesized and structurally characterized, its physicochemical properties were studied.

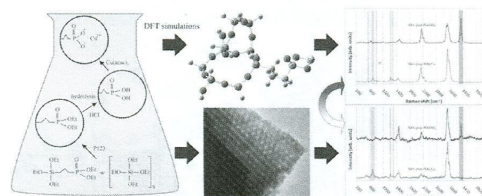
**Room temperature syntheses, crystal structures and properties of two new heterometallic polymers based on 3-ethoxy-2-hydroxybenzaldehyde ligand**

Shu-Hua Zhang, Ru-Xiao Zhao, Gui Li, Hai-Yang Zhang, Qiu-Ping Huang and Fu-Pei Liang  
page 206



**Functionalization of SBA-15 mesoporous silica by Cu-phosphonate units: Probing of synthesis route**

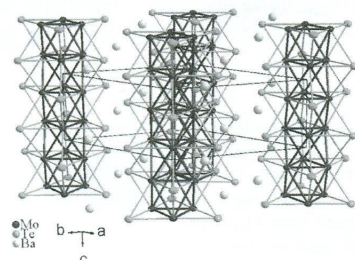
Lukasz Laskowski and Magdalena Laskowska  
page 221



The present study is devoted to mesoporous silica SBA-15 containing propyl-copper phosphonate units. The species were investigated to confirm of synthesis procedure correctness by the micro-Raman technique combined with DFT numerical simulations. Complementary research was carried out to test the structure of mesoporous samples.

**Synthesis, crystal structure, and electrical and magnetic properties of BaMo<sub>6</sub>Te<sub>6</sub>: A novel reduced molybdenum telluride containing infinite chains of trans-face shared Mo<sub>6</sub> octahedra**

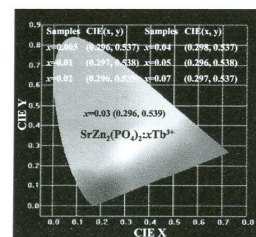
Philippe Gall, Thierry Guizouarn, Michel Potel and Patrick Gougeon  
page 213



We present here the synthesis, the crystal structure, and the electrical and magnetic properties of the new compound BaMo<sub>6</sub>Te<sub>6</sub> containing infinite chains of trans-face shared Mo<sub>6</sub> octahedra.

**Luminescent properties of SrZn<sub>2</sub>(PO<sub>4</sub>)<sub>2</sub>:Tb<sup>3+</sup> and its luminescence improvement by incorporating A<sup>+</sup> (A=Li, Na, and K)**

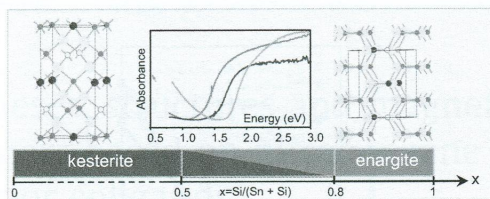
Panlai Li, Zhijun Wang, Zhiping Yang and Qinglin Guo  
page 227



SrZn<sub>2</sub>(PO<sub>4</sub>)<sub>2</sub>:Tb<sup>3+</sup> can produce green emission under near-UV excitation, and its luminescent properties can be improved by incorporating A<sup>+</sup> (A=Li, Na, and K).

### Crystal chemistry and optical investigations of the $\text{Cu}_2\text{Zn}(\text{Sn},\text{Si})\text{S}_4$ series for photovoltaic applications

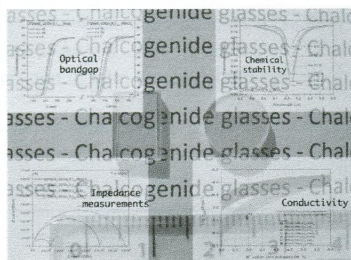
Mohamed Hamdi, Alain Lafond, Catherine Guillot-Deudon, Faouzi Hlel, Mohamed Gargouri and Stéphane Jobic  
page 232



Two solid solutions have been pointed out in the  $\text{Cu}_2\text{Zn}(\text{Sn}_{1-x}\text{Si}_x)\text{S}_4$  series with the kesterite and the enargite type structures.

### Influence of $\text{NaX}$ ( $X=\text{I}$ or $\text{Cl}$ ) additions on $\text{GeS}_2\text{-Ga}_2\text{S}_3$ based glasses

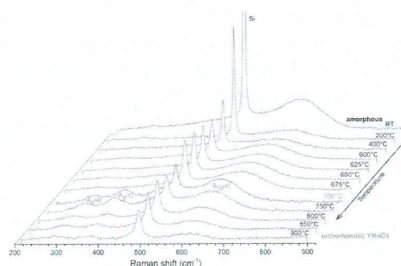
A. Bréhault, S. Cozic, R. Boidin, L. Calvez, E. Bychkov, P. Masselin, X. Zhang and D. Le Coq  
page 238



Characterizations of  $\text{NaX-GeS}_2\text{-Ga}_2\text{S}_3$  chalcogenide glasses ( $X=\text{Cl}$  or  $\text{I}$ ).

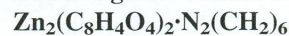
### Phase transformations and selective growth in $\text{YMnO}_3$ films

I. Iliescu, M. Boudard, O. Chaix-Pluchery, L. Rapenne and H. Roussel  
page 245

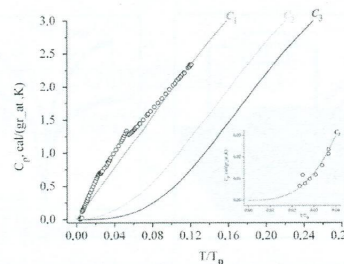


Temperature-dependent Raman spectra of an amorphous as-deposited  $\text{Y-Mn-O}$  film in the temperature range  $\text{RT} - 900^\circ\text{C}$ . The red spectrum marks the crystallization of the amorphous phase into the  $\text{o-YMnO}_3$  phase.

### Phase transitions and unusual behavior of heat capacity in metal organic framework compound



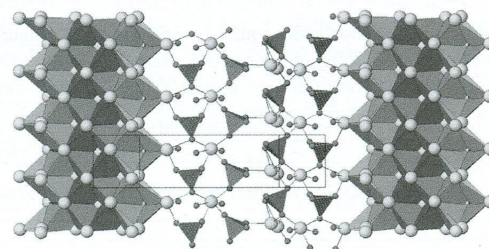
I.E. Paukov, D.G. Samsonenko, D.P. Pischur, S.G. Kozlova and S.P. Gabuda  
page 254



Specific heat  $C_p$  is proportional to the first degree of temperature showing a strong anisotropy of crystal vibrations corresponding to 1D continuum in  $\text{Zn}_2(\text{C}_8\text{H}_4\text{O}_4)_2 \cdot \text{N}_2(\text{CH}_2)_6$ .

### A new anion-deficient fluorite-related superstructure of $\text{Bi}_{28}\text{V}_8\text{O}_{62}$

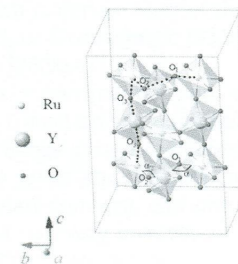
T. Đorđević and Lj. Karanović  
page 259



The  $[4\ 0\ 1]$  projection of two slabs and inter-slab part of the structure in one layer parallel to the  $(\bar{3}\ 0\ 8) = (0\ 0\ \bar{2})_F$  plane (F in subscript indicate a fluorite type structure). The large green circles are Bi atoms. Small blue circles represent partly and fully occupied O sites, respectively. Pink (hatched black) are  $\text{V1O}_4$  and blue (hatched white) are  $\text{V2O}_4$  coordination tetrahedra.

### Monoclinic distortion and magnetic coupling in the double perovskite $\text{Sr}_{2-x}\text{Ca}_x\text{YRuO}_6$

P.L. Bernardo, L. Ghivelder, G.G. Eslava, H.S. Amorim, I. Felner and S. Garcia  
page 270



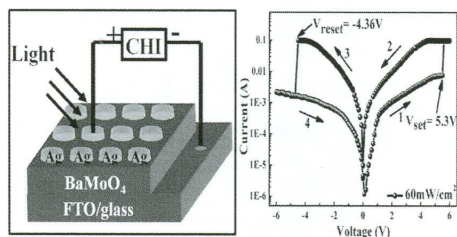
Tilting of the oxygen octahedra in  $\text{Sr}_{2-x}\text{Ca}_x\text{YRuO}_6$  due to strong monoclinic distortions.



## Rapid Communications

### A light-modified ferroelectric resistive switching behavior in Ag/BaMoO<sub>4</sub>/FTO device at ambient temperature

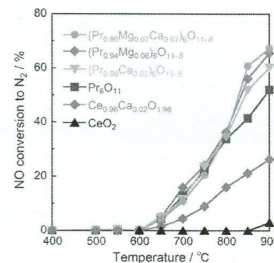
W.X. Zhao, B. Sun, Y.H. Liu, L.J. Wei, H.W. Li and P. Chen  
page 32



We fabricate a resistive switching device based on Ag/BaMoO<sub>4</sub>/FTO, the device shows superior white-light controlled bipolar resistive switching memristive characteristics.

### Effect of the introduction of oxide ion vacancies into cubic fluorite-type rare earth oxides on the NO decomposition catalysis

Toshiyuki Masui, Ryosuke Nagai and Nobuhito Imanaka  
page 181



Oxide anion vacancies intentionally introduced into the cubic fluorite-type lattice bring about positive effect on NO decomposition catalysis.

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