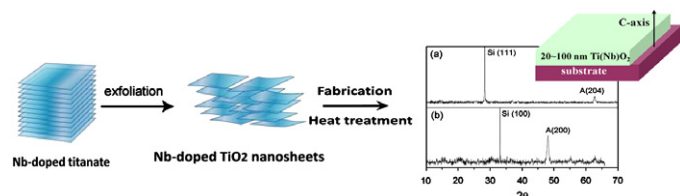


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### Regular Articles

#### Exfoliation and thermal transformations of Nb-substituted layered titanates

Haiyan Song, Anja O. Sjøstad, Helmer Fjellvåg, Hiroshi Okamoto, Ørnulv B. Vistad, Bjørnar Arstad and Poul Norby  
page 3135

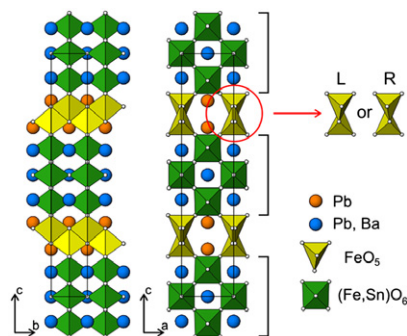


Layered Nb-titanates are appropriate precursors for formation of highly oriented Nb-substituted anatase thin films via delamination, reconstruction and subsequent heat treatment.

### Regular Articles—Continued

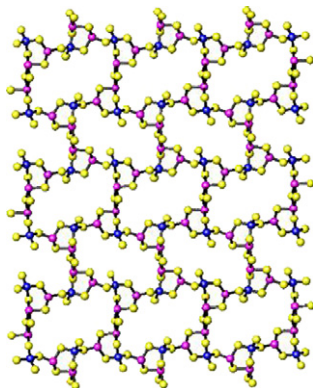
#### Pb<sub>2.85</sub>Ba<sub>2.15</sub>Fe<sub>4</sub>SnO<sub>13</sub>: A new member of the A<sub>n</sub>B<sub>n</sub>O<sub>3n-2</sub> anion-deficient perovskite-based homologous series

Oleg E. Korneychik, Maria Batuk, Artem M. Abakumov, Joke Hadermann, Marina G. Rozova, Denis V. Sheptyakov, Konstantin V. Pokholok, Dmitry S. Filimonov and Evgeny V. Antipov  
page 3150



#### Solvothermal synthesis of a bimetallic thiometallate containing germanium in two oxidation states

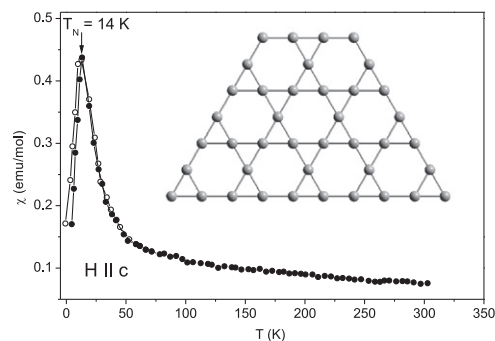
Anthony V. Powell and Rosalyn Mackay  
page 3144



[Ge(C<sub>2</sub>N<sub>2</sub>H<sub>8</sub>)<sub>3</sub>][GeSb<sub>2</sub>S<sub>6</sub>] is a mixed valent germanium compound that contains [GeSb<sub>2</sub>S<sub>8</sub>]<sup>6-</sup> units cross linked through Sb<sub>2</sub>S<sub>2</sub> units to generate layers.

#### BaSn<sub>6</sub>Co<sub>6</sub>O<sub>19</sub>—A novel frustrated antiferromagnet with the magnetoplumbite type structure

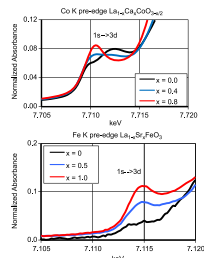
L. Shlyk and R. Niewa  
page 3158



Single crystals of novel magnetoplumbite BaSn<sub>6</sub>Co<sub>6</sub>O<sub>19</sub> have been characterized.

**X-ray absorption investigation of the valence state and electronic structure of  $\text{La}_{1-x}\text{Ca}_x\text{CoO}_{3-\delta}$  in comparison with  $\text{La}_{1-x}\text{Sr}_x\text{CoO}_{3-\delta}$  and  $\text{La}_{1-x}\text{Sr}_x\text{FeO}_{3-\delta}$**

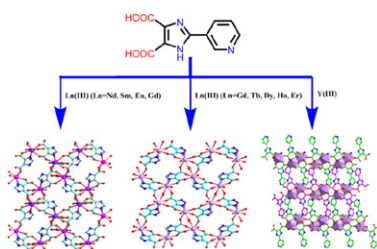
O. Haas, Chr. Ludwig, U. Bergmann, R.N. Singh, A. Braun and T. Graule  
page 3163



Co K and Fe K pre-edge of  $\text{La}_{1-x}\text{Ca}_x\text{CoO}_{3-\delta}$  and  $\text{La}_{1-x}\text{Sr}_x\text{FeO}_{3-\delta}$  perovskites one of the evidences in favor of  $\delta = x/2$  for the Co-perovskites and  $\delta = 0$  for the Fe-perovskites.

**A series of 2D lanthanide (III) coordination polymers constructed from 2-(pyridin-3-yl)-1H-imidazole-4,5-dicarboxylate**

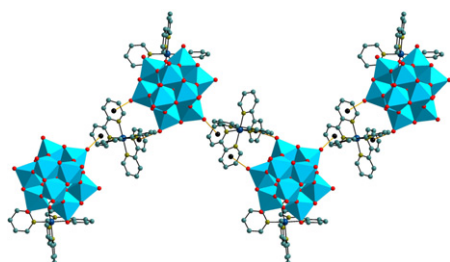
Song Liang Cai, Sheng Run Zheng, Jun Fan, Jing Bo Tan, Tian Tian Xiao and Wei-Guang Zhang  
page 3172



Structure variation of ten  $\text{Ln(III)}$  complexes is attributed to the lanthanide contraction effect and various coordination modes of  $\text{H}_3\text{PyIDC}$  ligands. Moreover, photoluminescent properties and thermal behaviors of selected complexes were investigated.

**Synthesis, structures and properties of new hybrid solids containing ruthenium complexes and polyoxometalates**

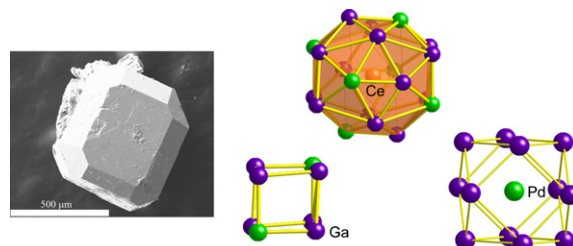
Bangbo Yan, Samantha A. Hodsdon, Yan-Fen Li, Christopher N. Carmichael, Yan Cao and Wei-Ping Pan  
page 3179



Two three-dimensional framework solids are constructed from polyoxoanions and ruthenium-organic complexes through non-covalent interactions.

**Structure and properties of rhombohedral  $\text{CePd}_3\text{Ga}_8$ : A variant of the cubic parent compound with  $\text{BaHg}_{11}$  structure type**

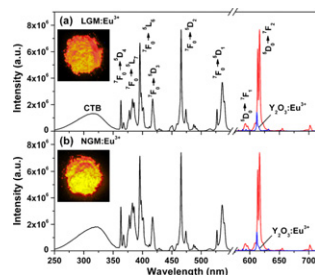
Robin T. Macaluso, Melanie Francisco, David P. Young, Shane Stadler, John F. Mitchell, Urs Geiser, Han-yul Hong and Mercurio G. Kanatzidis  
page 3185



Single crystals of  $\text{CePd}_3\text{Ga}_8$  have been synthesized from Ga flux. This new compound is the first rhombohedral variant of the cubic  $\text{BaHg}_{11}$  structure type.

**Synthesis and photoluminescence properties of the high-brightness  $\text{Eu}^{3+}$ -doped  $\text{M}_2\text{Gd}_4(\text{MoO}_4)_7$  ( $\text{M} = \text{Li}, \text{Na}$ ) red phosphors**

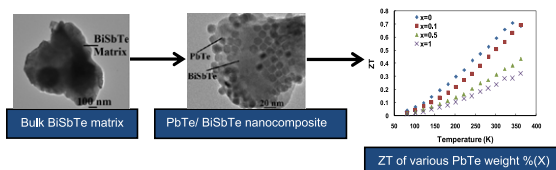
Chengchun Zhao, Xin Yin, Fuqiang Huang and Yin Hang  
page 3190



The intensity of the red emission of  $\text{M}_2(\text{Gd}_{1-x}\text{Eu}_x)_4(\text{MoO}_4)_7$  ( $\text{M} = \text{Li}, \text{Na}$ ) phosphors with the optimal compositions is about five times higher than that of  $\text{Y}_2\text{O}_3:\text{Eu}^{3+}$ .

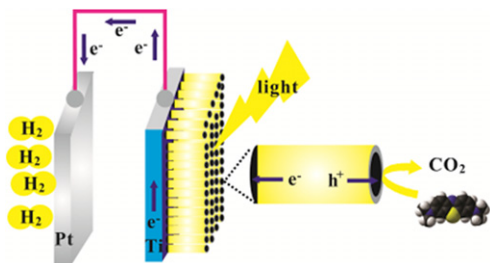
**Synthesis and evaluation of lead telluride/bismuth antimony telluride nanocomposites for thermoelectric applications**

Shreyashi Ganguly, Chen Zhou, Donald Morelli, Jeffrey Sakamoto, Ctirad Uher and Stephanie L. Brock  
page 3195



PbTe nanoparticles introduced into p-type  $\text{Bi}_2\text{Te}_3$  by incipient wetness results in decreased lattice thermal conductivity, but also acts as an electronic dopant, resulting in an overall decrease in thermoelectric performance.

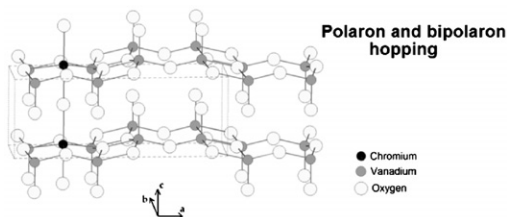
**Photoelectrochemical water splitting and simultaneous photoelectrocatalytic degradation of organic pollutant on highly smooth and ordered TiO<sub>2</sub> nanotube arrays**  
 Hongjun Wu and Zhonghai Zhang  
 page 3202



The photoelectrochemical water splitting for hydrogen generation and simultaneous photoelectrocatalytic degradation of organic pollutant (methylene blue) were achieved on TiO<sub>2</sub> nanotube electrodes with double purposes of environmental protection and renewable energy production under illumination of simulated solar light.

**Evidence for transition from polaron to bipolaron conduction in electroactive Li<sub>x</sub>Cr<sub>0.11</sub>V<sub>2</sub>O<sub>5.16</sub> powders: A dynamic study from 10 to 10<sup>10</sup> Hz**

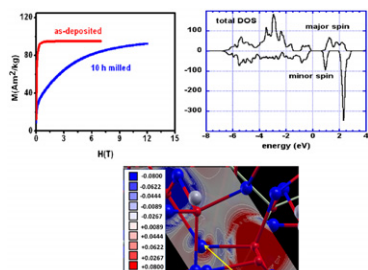
J.C. Badot and O. Dubrunfaut  
 page 3208



Schematic structure of Cr<sub>0.11</sub>V<sub>2</sub>O<sub>5.16</sub>.

**Magnetic and electronic properties of nanocrystalline Gd<sub>3</sub>Fe<sub>5</sub>O<sub>12</sub> garnet**

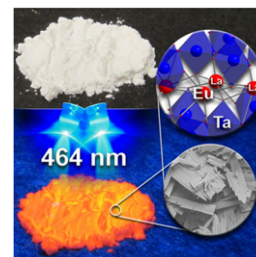
H. Lassri, E.K. Hlil, S. Prasad and R. Krishnan  
 page 3216



Random anisotropy fields, random anisotropy constant, substantial interstitial magnetism as well as magnetic quadrupolar feature on oxygen are determined from magnetization, theoretical random magnetic anisotropy model and FLAPW calculations in nanocrystalline Gadolinium Iron Garnet (GdIG).

**Seeking the optimal LaTaO<sub>4</sub>:Eu phosphor**

Grant C. Bleier, May Nyman, Lauren E.S. Rohwer and Mark A. Rodriguez  
 page 3221

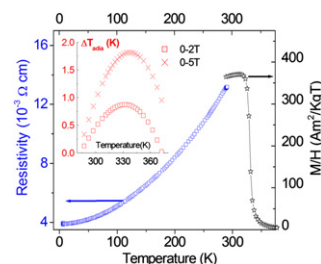


Eu-substituted lanthanum orthotantalates, LaTaO<sub>4</sub>:Eu, are excellent red phosphors. They exhibit up to 83% quantum-yield emission under blue light excitation, optimized through both 'soft chemical processing' and polymorph purity.

**Unusual oxidation states give reversible room temperature magnetocaloric effect on perovskite-related oxides**

**SrFe<sub>0.5</sub>Co<sub>0.5</sub>O<sub>3</sub>**

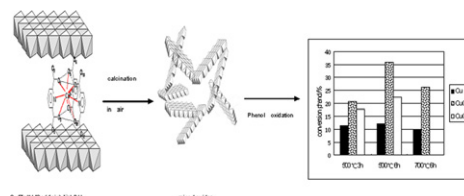
C. Yin, Q. Liu, R. Decourt, M. Pollet, E. Gaudin and O. Toulemonde  
 page 3228



Moderate but reversible magnetocaloric properties are associated with the 2nd order paramagnetic to ferromagnetic phase transition exhibited at 330 K. A metal-like behavior is seen for the first time on the ferromagnetic regime.

**Cu–Ce–O mixed oxides from Ce-containing layered double hydroxide precursors: Controllable preparation and catalytic performance**

Zheng Chang, Na Zhao, Junfeng Liu, Feng Li, David G. Evans, Xue Duan, Claude Forano and Marie de Roy  
 page 3232

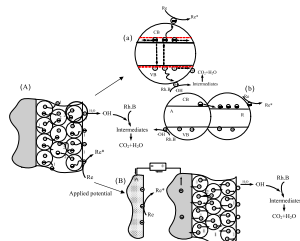


Cu–Ce–O mixed oxides calcined from [Ce(dipic)<sub>3</sub>]<sup>3-</sup>-intercalated Cu/Zn/Al layered double hydroxides were synthesized and displayed good catalytic performances in phenol oxidation due to the Cu–Ce interactions.

Continued

**Study on mechanism of photocatalytic performance of La-doped TiO<sub>2</sub>/Ti photoelectrodes by theoretical and experimental methods**

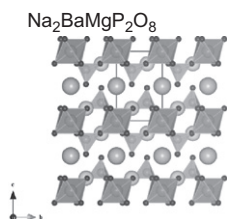
Yanjun Xin and Huiling Liu  
page 3240



Photophysical chemistry processes in as-prepared TiO<sub>2</sub> photoelectrodes. Overall scheme of TiO<sub>2</sub> photoelectrodes: (A) movement of photoelectrons and holes without bias potentials; (B) movement of photoelectrons and holes at applied bias potentials; (a) and (b) were the transmission of photogenerated electrons and holes of local enlargement of (A) (black open circle): (a) photoelectrons movement in P-TiO<sub>2</sub> photoelectrodes and La-TiO<sub>2</sub> photoelectrodes, the red dot line denotes the top of valence band (VB) and the bottom of conduction band (CB) of pure photoelectrodes; (b) photoelectrons movement in P-160 and La-160 TiO<sub>2</sub> photoelectrodes (mixed crystal phase). The number refers to as follows: (1) transmission process of photoelectrons and holes; (2) recombination process of photoelectrons and holes. Arrows represent the moving direction of photoelectrons.

**Crystal structure of Na<sub>2</sub>MMgP<sub>2</sub>O<sub>8</sub> (M: Ba, Sr, Ca) orthophosphates and their luminescence properties activated by Eu<sup>2+</sup>; analogous structural behaviors of glaserite-type phosphates and silicates**

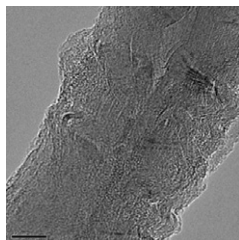
Yoshinori Yonesaki and Chihiro Matsuda  
page 3247



Emission properties of Na<sub>2</sub>MMgP<sub>2</sub>O<sub>8</sub> (M: Ba, Sr, Ca) are discussed from the viewpoint of the crystal structure solved by X-ray powder diffraction technique.

**Functionalization of multi-walled carbon nanotubes by epoxide ring-opening polymerization**

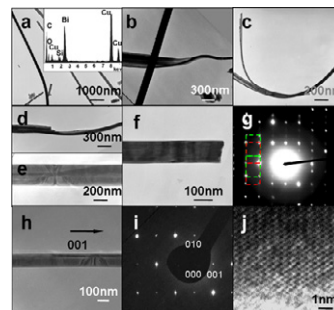
Fan-Long Jin, Kyong Yop Rhee and Soo-Jin Park  
page 3253



Functionalized CNTs were wrapped by polymer chains with thickness of several nanometers, forming core-shell structures with CNTs at the center.

**Structure and resistivity of bismuth nanobelts *in situ* synthesized on silicon wafer through an ethanol-thermal method**

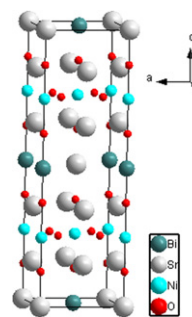
Zheng Gao, Haiming Qin, Tao Yan, Hong Liu and Jiyang Wang  
page 3257



TEM images, EDS, and electron diffraction pattern of bismuth nanobelts.

**Synthesis, crystal structure and physico-chemical properties of the new quaternary oxide Sr<sub>5</sub>BiNi<sub>2</sub>O<sub>9,6</sub>**

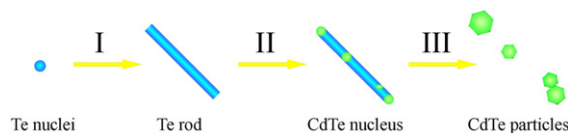
Mariya Novitskaya, Leonid Makhnach, Ludmila Ivashkevich, Vladimir Pankov, Holger Klein, Amélie Rageau, Jérémy David, Mauro Gemmi, Joke Hadermann and Pierre Strobel  
page 3262



View of the structure of new Sr<sub>5</sub>BiNi<sub>2</sub>O<sub>9,6</sub> oxide.

**Influence of EDTA<sup>2-</sup> on the hydrothermal synthesis of CdTe nanocrystallites**

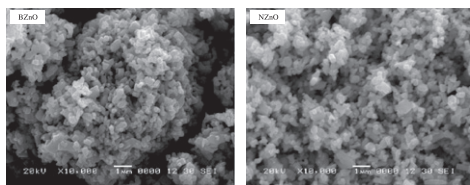
Haibo Gong, Xiaopeng Hao, Yongzhong Wu, Bingqiang Cao, Hongyan Xu and Xiangang Xu  
page 3269



Firstly, Te nucleated and grew into nanorods in the presence of EDTA<sup>2-</sup>. Then CdTe nucleus began to emerge on Te nanorods and finally monodispersed CdTe nanoparticles were obtained.

## Enhancement of oxygen vacancies and solar photocatalytic activity of zinc oxide by incorporation of nonmetal

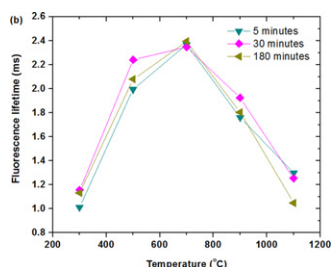
Ashokrao B. Patil, Kashinath R. Patil and Satish K. Pardeshi  
page 3273



B-doped ZnO and N-doped ZnO synthesized by mechanochemical method were characterized by various techniques. Solar photocatalytic degradation of Bisphenol-A is in the order of B-ZnO > N-ZnO > ZnO.

## Correlation of optical properties and temperature-induced irreversible phase transitions in europium-doped yttrium carbonate nanoparticles

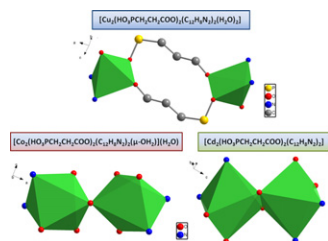
Ray Gunawidjaja, Thandar Myint and Hergen Eilers  
page 3280



Fluorescence lifetimes of Eu-doped Y<sub>2</sub>O<sub>3</sub> precursors heated for 5, 30, and 180 min to various temperatures.

## Synthesis, crystal structure and magnetic characterization of metal(II) coordination polymers based on 2-carboxyethylphosphonic acid and 1,10-phenanthroline (metal = Cu, Co, Cd)

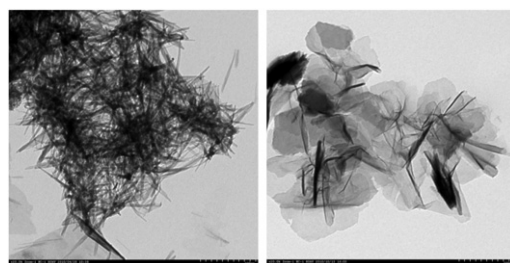
Eva Fernández-Zapico, Jose Manuel Montejó-Bernardo, Richard D'Vries, José R. García, Santiago García-Granda, Jesús Rodríguez Fernández, Imanol de Pedro and Jesús A. Blanco  
page 3289



In same synthetic conditions, both the chemical and structural features of three transition metal(II) coordination polymers based on 2-carboxyethylphosphonate and 1-10'-phenanthroline are influenced by the metal cation characteristics, leading to non-homologous materials with different properties, which show the high chemical versatility of this interesting system.

## Controllable synthesis and growth mechanism of α-Co(OH)<sub>2</sub> nanorods and nanoplates by a facile solution-phase route

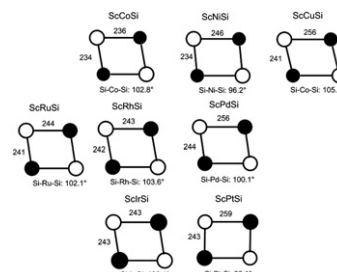
Wenzhong Wang, Kai Feng, Zhi Wang, Yunyan Ma, Suyun Zhang and Yujie Liang  
page 3299



A facile solution-phase route has been developed to synthesize α-Co(OH)<sub>2</sub> nanorods and nanoplates. The possible growth mechanism of nanorods and nanoplates was proposed.

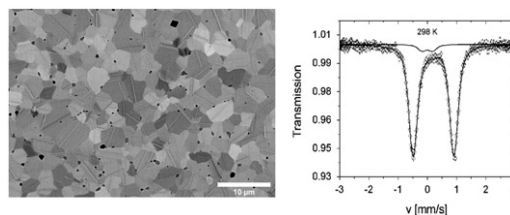
## <sup>45</sup>Sc Solid State NMR studies of the silicides ScT<sub>2</sub>Si (T = Co, Ni, Cu, Ru, Rh, Pd, Ir, Pt)

Thomas Harmening, Hellmut Eckert, Constanze M. Fehse, C. Peter Sebastian and Rainer Pöttgen  
page 3303



## Effect of doping, microstructure, and CO<sub>2</sub> on La<sub>2</sub>NiO<sub>4+δ</sub>-based oxygen-transporting materials

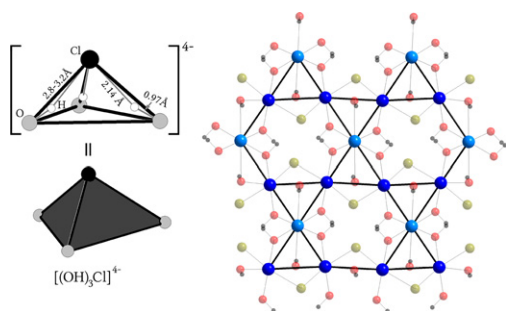
Tobias Klande, Konstantin Efimov, Salvatore Cusenza, Klaus-Dieter Becker and Armin Feldhoff  
page 3310



The vibrational polished La<sub>2</sub>Ni<sub>0.9</sub>Fe<sub>0.1</sub>O<sub>4+δ</sub> membrane revealed formation of secondary phases, which were confirmed by Mössbauer spectroscopy.

### CdCu<sub>3</sub>(OH)<sub>6</sub>Cl<sub>2</sub>: A new layered hydroxide chloride

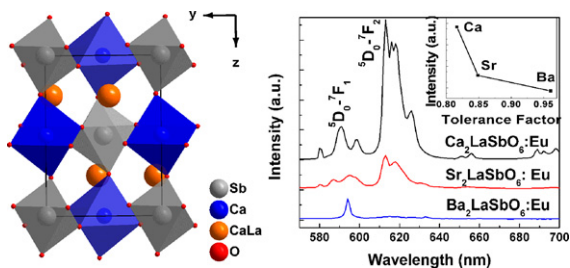
T.M. McQueen, T.H. Han, D.E. Freedman,  
P.W. Stephens, Y.S. Lee and D.G. Nocera  
page 3319



The [(OH)<sub>3</sub>Cl]<sup>4-</sup> pseudopolyatomic anion and the kagomé lattice of CdCu<sub>3</sub>[(OH)<sub>3</sub>Cl]<sub>2</sub>.

### Excellent red phosphors of double perovskite Ca<sub>2</sub>LaMO<sub>6</sub>:Eu (M=Sb, Nb, Ta) with distorted coordination environment

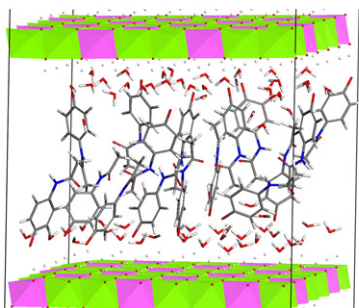
Xin Yin, Yaoming Wang, Fuqiang Huang, Yujuan Xia,  
Dongyun Wan and Jiyong Yao  
page 3324



Eu<sup>3+</sup> doped double-perovskite compounds A<sub>2</sub>LnMO<sub>6</sub> (A=Ca, Sr, Ba; Ln=La, Gd, Y; M=Sb, Nb, Ta) show the dependence of luminescence intensity on the crystal structure.

### Intercalation of paracetamol into the hydroxalcite-like host

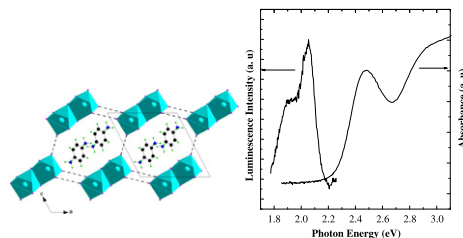
František Kovanda, Zuzana Maryšková and Petr Kovář  
page 3329



Molecular simulations showed disordered arrangement of paracetamol molecules in the interlayer; most of the interlayer water molecules are located near the hydroxide sheets.

### $\alpha$ - to $\beta$ -[C<sub>6</sub>H<sub>4</sub>(NH<sub>3</sub>)<sub>2</sub>]<sub>2</sub>Bi<sub>2</sub>I<sub>10</sub> reversible solid-state transition, thermochromic and optical studies in the *p*-phenylenediamine-based iodobismuthate(III) material

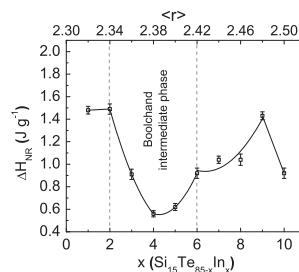
Chakib Hrzi, Ameni Trigui, Younes Abid, Nassira Chniba-Boudjada, Pierre Bordet and Slaheddine Chaabouni  
page 3336



The structure of  $\alpha$ -[C<sub>6</sub>H<sub>4</sub>(NH<sub>3</sub>)<sub>2</sub>]<sub>2</sub>Bi<sub>2</sub>I<sub>10</sub> consists of *p*-phenylenediammonium dication and dimeric decaiodobismuthate tetra-anions stacked in a chessboard fashion. The optical properties were investigated by optical absorption and photoluminescence measurements.

### Thermodynamic, kinetic and electrical switching studies on Si<sub>15</sub>Te<sub>85-x</sub>In<sub>x</sub> glasses: Observation of Boolchand intermediate phase

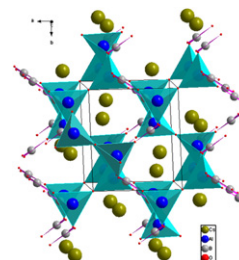
Srinivasa Rao Gunti, Arunbabu Ayiriveetil and Asokan Sundarajan  
page 3345



The variation of non-reversing heat flow ( $\Delta H_{NR}$ ) of Si<sub>15</sub>Te<sub>85-x</sub>In<sub>x</sub> glasses with composition ( $x$ ) and average coordination number ( $\langle r \rangle$ ). The Boolchand intermediate phase can be seen in the composition range  $2 \leq x \leq 6$ .

### Synthesis, structural characterization and optical properties of a new cesium aluminum borate, Cs<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub>

Kai Feng, Wenlong Yin, Jiyong Yao and Yicheng Wu  
page 3353

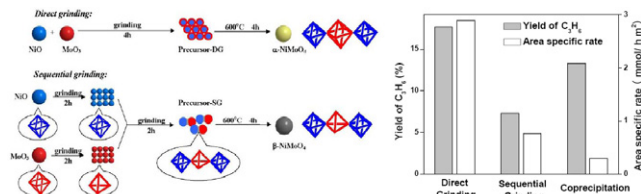


A new borate, Cs<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub>, was synthesized. In the structure, BO<sub>3</sub> triangles and AlO<sub>4</sub> tetrahedra are connected to form a three-dimensional framework with Cs<sup>+</sup> in the channels.

## A practical grinding-assisted dry synthesis of nanocrystalline NiMoO<sub>4</sub> polymorphs for oxidative dehydrogenation of propane

Miao Chen, Jia-Ling Wu, Yong-Mei Liu, Yong Cao, Li Guo, He-Yong He and Kang-Nian Fan

page 3357

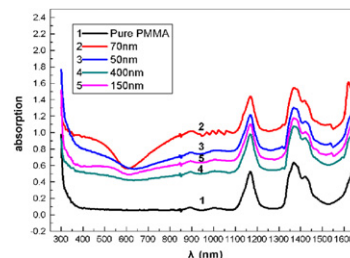


Grinding-assisted synthesis of NiMoO<sub>4</sub> offers higher and more reproducible activities in contrast to coprecipitation for oxidative dehydrogenation of propane, and both α- and β-NiMoO<sub>4</sub> can be synthesized.

## Size effect of added LaB<sub>6</sub> particles on optical properties of LaB<sub>6</sub>/Polymer composites

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page 3364



70 nm LaB<sub>6</sub> particles resulted in the best performance on absorption of VIS and NIR, which could not be apparently achieved by LaB<sub>6</sub> particles beyond nano-scale.

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