

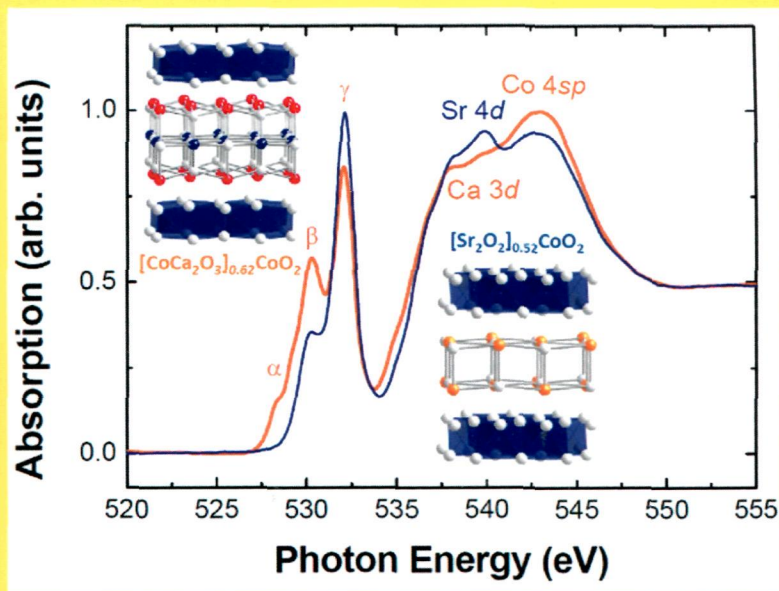
JOURNAL OF SOLID STATE CHEMISTRY

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IN THIS ISSUE:

**X-ray absorption spectroscopy study of parent misfit-layered
cobalt oxide $[\text{Sr}_2\text{O}_2]_q\text{CoO}_2$**



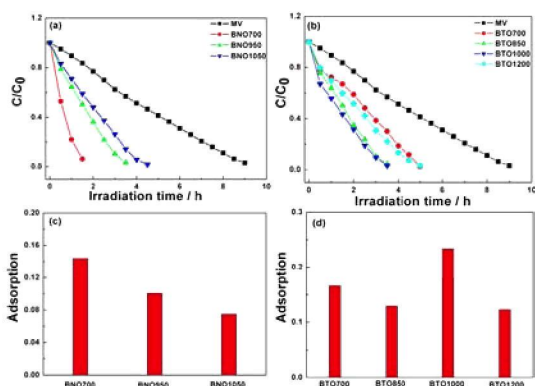
**Ta-Lei Chou, Ting-Shan Chan, Jin-Ming Chen,
Hisao Yamauchi and Maarit Karppinen**

Abstracted/indexed in BioEngineering Abstracts, Chemical Abstracts, Coal Abstracts, Current Contents/Physics, Chemical, & Earth Sciences, Engineering Index, Research Alert, SCISEARCH, Science Abstracts, and Science Citation Index. Also covered in the abstract and citation database SciVerse SCOPUS®. Full text available on SciVerse ScienceDirect®.

Regular Articles

Preparation and visible-light photocatalytic properties of BiNbO₄ and BiTaO₄ by a citrate method

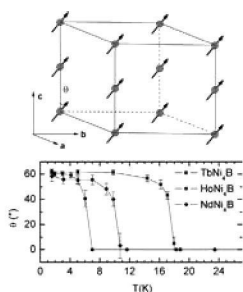
Hai-Fa Zhai, Ai-Dong Li, Ji-Zhou Kong, Xue-Fei Li, Jie Zhao, Bing-Lei Guo, Jiang Yin, Zhao-Sheng Li, Di Wu
page 6



Photodegradation performance and adsorption ability of BiNbO₄ and BiTaO₄ powders, respectively. BNO700 with the best photocatalytic efficiency is ascribed to its large surface area and more positive conduction band level.

Magnetic structures in RNi₄B (R = Nd, Tb, Ho, Er)

E. Alleno, C. Mazumdar
page 15

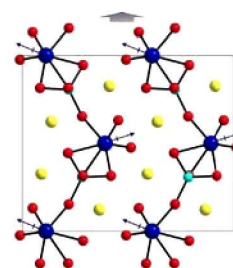


Simplified magnetic structure in NdNi₄B and full magnetic structure in RNi₄B (R = Tb, Ho). Variation with temperature of the easy magnetization axis direction (angle with *c*-axis) showing a spin re-orientation.

Regular Articles—Continued

Large scale synthesis, second-harmonic generation, and piezoelectric properties of a noncentrosymmetric vanadium phosphate, Li₂VPO₆

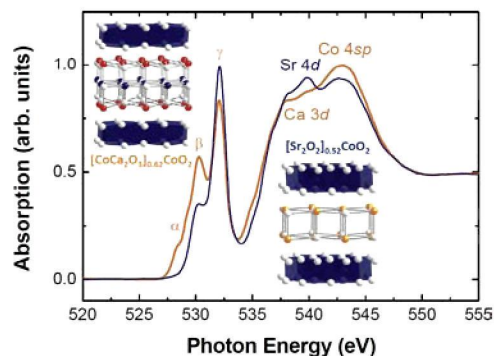
Eun Pyo Lee, Dong Woo Lee, Yoon-Ho Cho, T. Thao Tran, P. Shiv Halasyamani, Kang Min Ok
page 22



A net moment arising from the alignment of the distorted VO₆ octahedra is responsible for the SHG and piezoelectricity for the noncentrosymmetric vanadium phosphate, Li₂VPO₆.

X-ray absorption spectroscopy study of parent misfit-layered cobalt oxide [Sr₂O₂]_qCoO₂

Ta-Lei Chou, Ting-Shan Chan, Jin-Ming Chen, Hisao Yamauchi, Maarit Karppinen
page 27

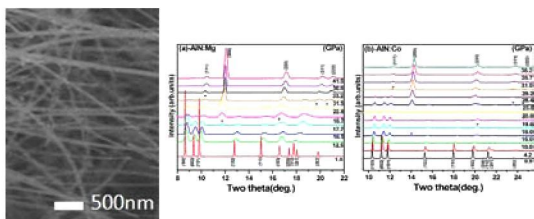


[Sr₂O₂]_{0.52}CoO₂ obtained through high-pressure synthesis is a parent of misfit-layered cobalt oxides, such as [CoCa₂O₃]_{0.62}CoO₂ or [M_mA₂O_{2+m}]_qCoO₂ in general. Our comprehensive X-ray absorption spectroscopy study shows that both [Sr₂O₂]_{0.52}CoO₂ and [CoCa₂O₃]_{0.62}CoO₂ possess mixed III/IV valence cobalt, but the average Co-valence is a little lower in the former. This is tentatively believed to be due to OH⁻ groups replacing part of O²⁻ ions in the [Sr₂O₂] layer block.

Continued

Pressure-induced structural phase transition in AlN:Mg and AlN:Co nanowires

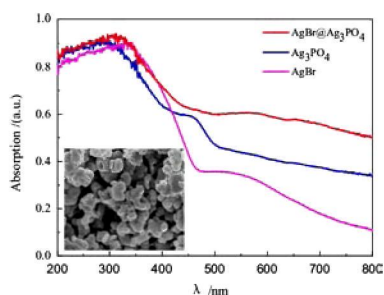
Yongsheng Xu, Hongyang Zhu, Chunli Ma, Pinwen Zhu, Ridong Cong, Xiaoxin Wu, Wei Gao, Qiliang Cui
page 33



The high-pressure behaviors of AlN:Mg and AlN:Co nanowires have been investigated by *in situ* angle dispersive synchrotron X-ray diffraction.

Novel visible-light AgBr/Ag₃PO₄ hybrids photocatalysts with surface plasma resonance effects

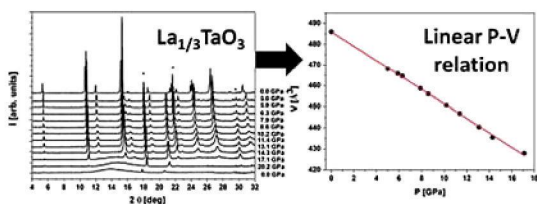
Yunfang Wang, Xiuli Li, Yawen Wang, Caimei Fan
page 51



The optical absorption and structural morphology of the as-prepared AgBr@Ag₃PO₄ photocatalyst using an anion-exchange precipitation method are conducive to the photocatalytic degradation of organics in water.

Pressure-induced amorphization of La_{1/3}TaO₃

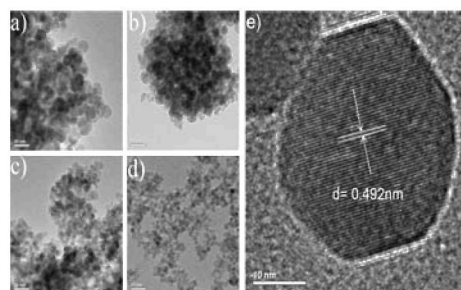
O. Noked, A. Melchior, R. Shuker, T. Livneh, R. Steininger, B.J. Kennedy, E. Sterer
page 38



La_{1/3}TaO₃ exhibits linear pressure-volume relation until irreversible pressure induced amorphization at 18.5 Gpa.

Effect of organic solvents on particle size of Mn₃O₄ nanoparticles synthesized by a solvothermal method

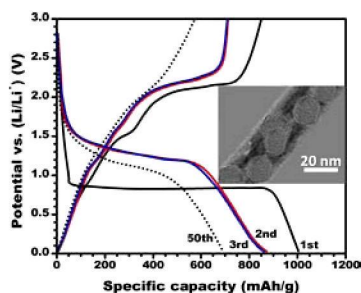
Rui Song, Shouhua Feng, Hongjun Wang, Changmin Hou
page 57



The comparison of the particle size of Mn₃O₄ nanoparticles synthesized using different solvents and HRTEM image of Mn₃O₄ individual nanoparticle revealed its single-crystal nature.

Modification of carbon nanotubes by CuO-doped NiO nanocomposite for use as an anode material for lithium-ion batteries

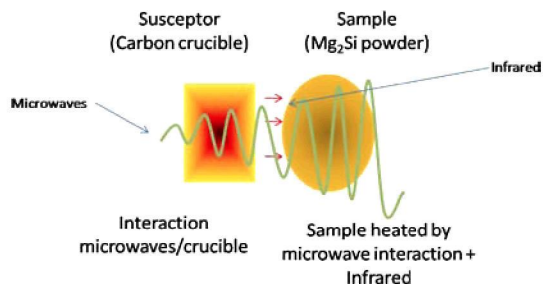
Syed Mustansar Abbas, Syed Tajammul Hussain, Saqib Ali, Nisar Ahmad, Nisar Ali, Saghir Abbas, Zulfiqar Ali
page 43



The porous CuNiO/CNT nanocomposite synthesized via a modified co-precipitation method in combination with subsequent calcination was applied in the negative electrode materials for lithium-ion batteries and exhibited high electrochemical performance.

Microwaved assisted fast synthesis of n and p-doped Mg₂Si

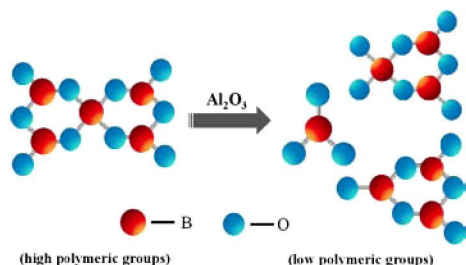
David Berthebaud, Franck Gascoin
page 61



Schematic representation of microwave hybrid heating.

Relationship between Eu^{3+} reduction and glass polymeric structure in Al_2O_3 -modified borate glasses under air atmosphere

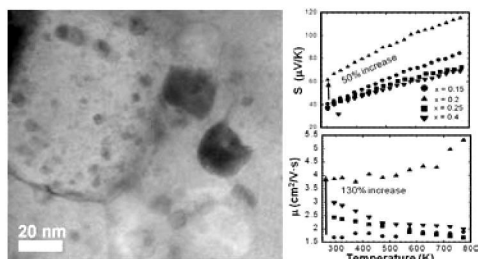
Qing Jiao, Xue Yu, Xuhui Xu, Dacheng Zhou, Jianbei Qiu
page 65



A novel europium valence reduction phenomenon occurred in Al_2O_3 modified borate glasses, FTIR and Raman measurements revealed that high polymeric groups were destroyed to low polymeric structures with Al_2O_3 addition.

Thermoelectric performance of nanostructured p-type $\text{Zr}_{0.5}\text{Hf}_{0.5}\text{Co}_{0.4}\text{Rh}_{0.6}\text{Sb}_{1-x}\text{Sn}_x$ half-Heusler alloys

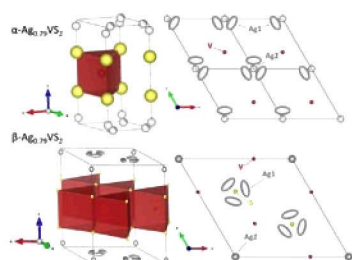
Pramathesh Maji, Julien P.A. Makongo, Xiaoyuan Zhou, Hang Chi, Ctirad Uher, Pierre F.P. Poudeu
page 70



CoSb nanoinclusions embedded into a p-type $\text{Zr}_{0.5}\text{Hf}_{0.5}\text{Co}_{0.4}\text{Rh}_{0.6}\text{Sb}_{1-x}\text{Sn}_x$ half-Heusler matrix simultaneously boost the thermopower and carrier mobility leading to a drastic enhancement of the power factor of the resulting bulk nanostructured materials.

Synthesis and characterization of two crystallographic forms of $\text{Ag}_{0.79}\text{VS}_2$

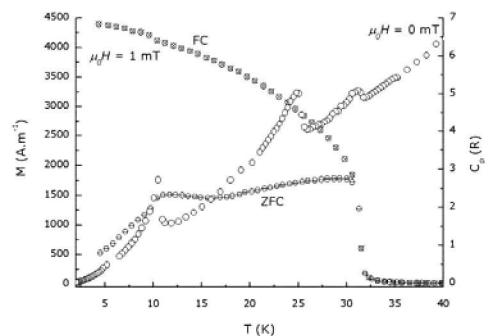
Mazhar N. Ali, Huiwen Ji, Daigorou Hirai, M.K. Fuccillo, R.J. Cava
page 77



Red = Vanadium, Gray = Silver, Yellow = Sulfur. Top left is $\alpha\text{-Ag}_{0.79}\text{VS}_2$ in the $1s\text{-InTaS}_2$ structure type. Top right: $2a \times 2b$ projection down the c -axis with displacement ellipsoids (50% probability) of atoms drawn to illustrate the split silver model. Bottom left is $\beta\text{-Ag}_{0.79}\text{VS}_2$ having the $a_0\sqrt{3}$ supercell. Bottom right: projection along the c -axis, displacement ellipsoids of atoms drawn.

On the synthesis, characterization and magnetic properties of two new phases discovered in the $\text{PbO-Fe}_2\text{O}_3\text{-P}_2\text{O}_5$ system

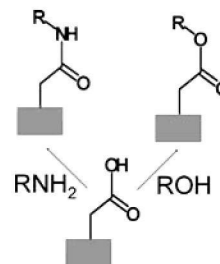
Hassan El Hafid, Matias Velázquez, Olivier Pérez, Abdelaziz El Jazouli, Alain Pautrat, Rodolphe Decourt, Emmanuel Véron, Oudomsack Viraphong, Claude Delmas
page 85



Three ferromagnetic-like phase transitions discovered in the new compound $\text{PbFe}_3\text{O}(\text{PO}_4)_3$ by specific heat and ZFC/FC magnetization measurements.

Synthesis and characterization of ester and amide derivatives of titanium(IV) carboxymethylphosphonate

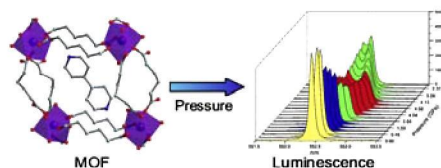
Klára Melánová Ludvík Beneš, Miroslava Trchová, Jan Svoboda Vítězslav Zima
page 93



Ester and amide derivatives of layered titanium carboxymethylphosphonate were prepared by solvothermal treatment of amorphous solid with alkanol or alkylamine.

The influence of pressure on the photoluminescence properties of a terbium-adipate framework

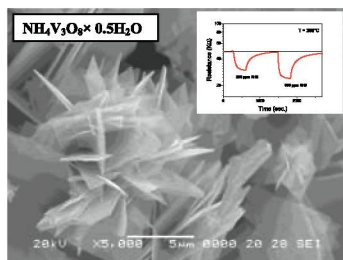
Elinor C. Spencer, Jing Zhao, Nancy L. Ross, Michael B. Andrews, Robert G. Surbella, Christopher L. Cahill
page 99



The influence of pressure on the structure and photoluminescence emissions of a 3D terbium-adipate framework.

Behavior of sheet-like crystalline ammonium trivanadate hemihydrate ($\text{NH}_4\text{V}_3\text{O}_8 \times 0.5\text{H}_2\text{O}$) as a novel ammonia sensing material

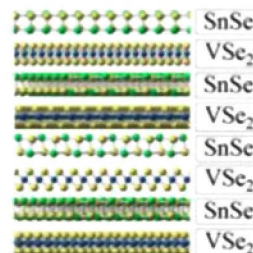
S.G. Leonardi, P. Primerano, N. Donato, G. Neri
page 105



Sheet-like morphology of the synthesized trivanadate hemihydrate ($\text{NH}_4\text{V}_3\text{O}_8 \times 0.5\text{H}_2\text{O}$). Inset: Its electrical response to different ammonia concentrations in air.

Synthesis, structure and electrical properties of a new tin vanadium selenide

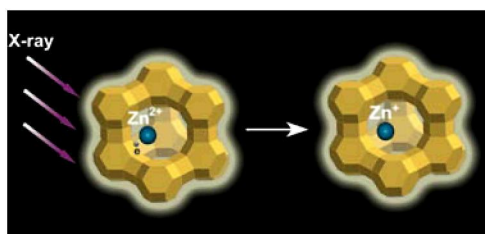
Ryan Atkins, Sabrina Disch, Zachary Jones, Ines Haeusler, Corinna Grosse, Saskia F. Fischer, Wolfgang Neumann, Paul Zschack, David C. Johnson
page 128



Turbostratically disordered $(\text{SnSe})_{1.15}\text{VSe}_2$.

Elucidation of the chemical environment for zinc species in an electron-rich zinc-incorporated zeolite

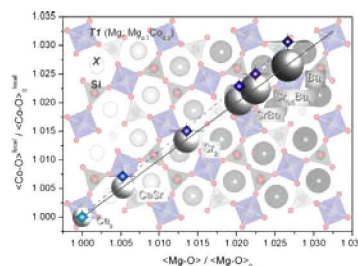
Jing-Feng Wang, Kai-Xue Wang, Jian-Qiang Wang, Lu Li, Yan-Mei Jiang, Xing-Xing Guo, Jie-Sheng Chen
page 111



The chemical environment of the zinc species in an electron-rich zeolite has been elucidated on the basis of X-ray absorption spectroscopy.

Next neighbors effect along the CaSrBa-åkermanite join: Long-range vs. short-range structural features

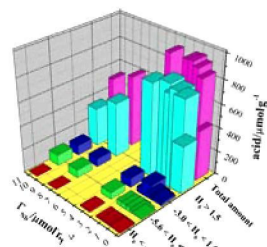
Michele Dondi, Matteo Ardit, Giuseppe Cruciani
page 134



Average $\langle \text{MgO} \rangle$ vs. local $\langle \text{CoO}_{\text{local}} \rangle$ tetrahedral bond distances in function of the average X cation radius in the $(\text{Ca}, \text{Sr}, \text{Ba})_2(\text{Mg}_{0.7}\text{Co}_{0.3})\text{Si}_2\text{O}_7$ join.

Dispersion states and acid properties of SiO_2 -supported Nb_2O_5

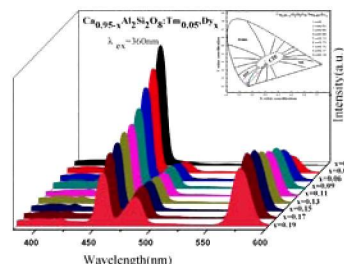
Jie He, Qing-Jie Li, Yi-Ning Fan
page 121



The acid amount and strength of $\text{Nb}_2\text{O}_5/\text{SiO}_2$ samples varied with the increase of Nb_2O_5 loading. The catalytic activities of the as-prepared samples for the condensation and their acid properties were strongly affected by the dispersion states.

Single-phased $\text{CaAl}_2\text{Si}_2\text{O}_8:\text{Tm}^{3+}, \text{Dy}^{3+}$ white-light phosphors under ultraviolet excitation

Penghui Yang, Xue Yu, Xuhui Xu, Tingming Jiang, Hongling Yu, Dacheng Zhou, Zhengwen Yang, Zhiguo Song, Jianbei Qiu
page 143

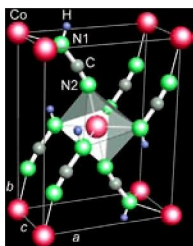


The results indicate the existence of energy transfer from Tm^{3+} to Dy^{3+} . By tuning the concentration of Dy^{3+} , single-phased white light can be realized.

The magnetic structure of $\text{Co}(\text{NCNH})_2$ as determined by (spin-polarized) neutron diffraction

Philipp Jacobs, Andreas Houben, Anatoliy Senyshyn, Paul Müller, Richard Dronskowski

page 149

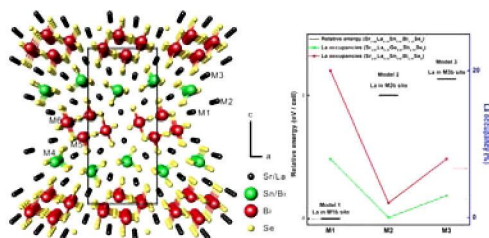


The magnetic ground state of $\text{Co}(\text{NCNH})_2$ has been clarified by (spin-polarized) neutron diffraction data at low temperatures. Intensity changes below 4 K arise due to the onset of ferromagnetic ordering of the Co^{2+} spins parallel to the c axis, corroborated by various (magnetic) Rietveld refinements.

New quinternary selenides: Syntheses, characterizations, and electronic structure calculations

Ming-Yan Chung, Chi-Shen Lee

page 154

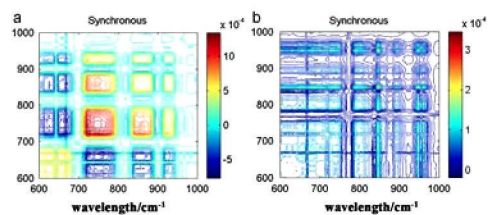


Quinternary selenides $Ae_{2.67}M_{0.33}Tl_{0.67}Pn_{2.33}Se_8$ ($Ae, M, Tl, Pn = \text{Sr/Ba, Y/La, Ge/Sn, Sb/Bi}$) were synthesized and their site preferences were characterized by single-crystal X-ray diffraction and electronic structure calculation.

Two Keggin-type heteropolytungstates with transition metal as a central atom: Crystal structure and magnetic study with 2D-IR correlation spectroscopy

Feng Chai, YiPing Chen, ZhuChai You, ZeMin Xia, SuZhi Ge, YanQiong Sun, BiHua Huang

page 161



The magnetic-dependent synchronous 2D correlation IR spectra of **1** (a), **2** (b) over 0–50 mT in the range of 600–1000 cm^{-1} , the obvious response indicate two Keggin polyanions skeleton susceptible to applied magnetic field.

The “quiet Goldschmidt”—a mechanochemical, thermoanalytical, and spectroscopic study of selected steps of the aluminothermic reaction

R. Stößer, M. Feist, C. Willgeroth, F. Emmerling, M. Menzel, H. Reuther

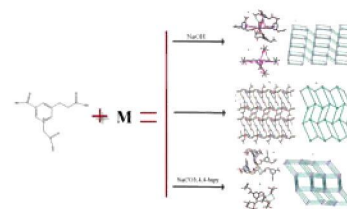
page 173



Six new coordination polymers constructed by 3-carboxyl-5-oxycarboxymethylpyridinio-1-carboxylate: Crystal structures, topologies, photoluminescent and magnetic properties

Hong-Yan Yuan, Min-Min Han, Xian-Rong Jiang, Zhan-Guo Jiang, Yun-Long Feng

page 191

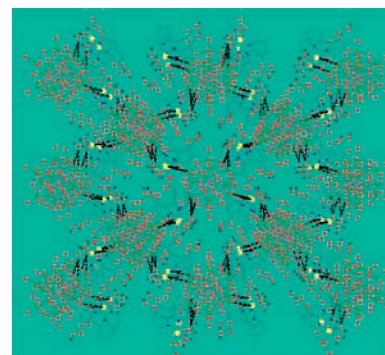


The structural differences show that the ligand, the metal center, and the reaction conditions have great influence on the structure of the final assembly.

A 3D POM–MOF composite based on Ni(II) ion and 2,2'-bipyridyl-3,3'-dicarboxylic acid: Crystal structure and proton conductivity

Meilin Wei, Xiaoxiang Wang, Jingjing Sun, Xianying Duan

page 200

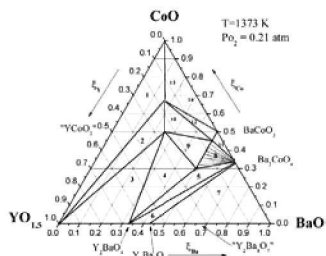


A POM–MOF composite constructed by Keggin-type polyanion, Ni^{2+} and H_2bpdc shows good proton conductivities of 10^{-4} – $10^{-3} \text{ S cm}^{-1}$ at 100 °C under 3598% RH.

Continued

Phase equilibria, crystal structure and oxygen content of intermediate phases in the Y–Ba–Co–O system

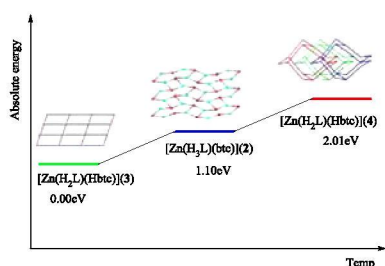
A.S. Urusova, V.A. Cherepanov, T.V. Aksenova, L.Ya. Gavrilova, E.A. Kiselev
page 207



A projection of isobaric isothermal phase diagram of the Y–Ba–Co–O system to the metallic components triangle ($T = 1373$ K, $P_{O_2} = 0.21$ atm).

Synthesis and characterization of d^{10} metal complexes with mixed 1,3-di(1H-imidazol-4-yl)benzene and multicarboxylate ligands

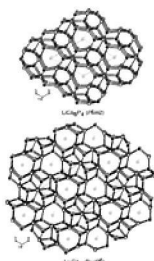
Zhi-Hao Chen, Yue Zhao, Shui-Sheng Chen, Peng Wang, Wei-Yin Sun
page 215



Seven new coordination polymers with multicarboxylate and rigid ditopic 4-imidazole containing ligands have been obtained and found to show different structures and topologies.

Ab initio investigations of the electronic structures and chemical bonding in LiCo_6P_4 and $\text{Li}_2\text{Co}_{12}\text{P}_7$

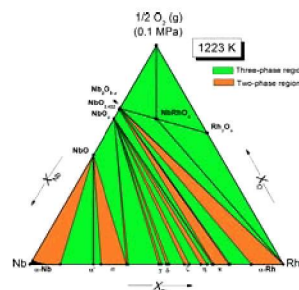
Samir F. Matar, Adel Al-Alam, Naïm Ouaini, Rainer Pöttgen
page 227



The cobalt–phosphorus networks in LiCo_6P_4 and $\text{Li}_2\text{Co}_{12}\text{P}_7$.

Phase chemistry of the system Nb–Rh–O

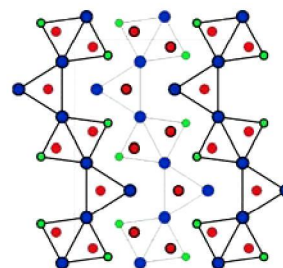
K.T. Jacob, Preeti Gupta, M. Vinay, Y. Waseda
page 234



Isothermal section of ternary phase diagram for the system Nb–Rh–O at 1223 K.

Ternary rare-earth ruthenium and iridium germanides $\text{RE}_3\text{M}_2\text{Ge}_3$ ($\text{RE} = \text{Y, Gd–Tm, Lu}$; $\text{M} = \text{Ru, Ir}$)

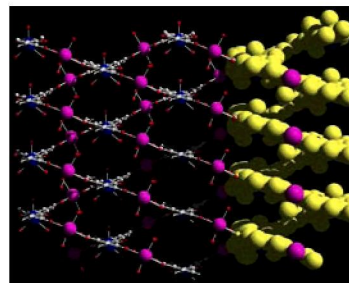
Anton O. Oliynyk, Stanislav S. Stoyko, Arthur Mar
page 241



$\text{RE}_3\text{M}_2\text{Ge}_3$ ($\text{M} = \text{Ru, Ir}$) adopts the $\text{Hf}_3\text{Ni}_2\text{Si}_3$ -type structure containing slabs built up from Ge-centred trigonal prisms.

Structural variations and photoluminescent properties of a series of metal-organic frameworks constructed from 5-(4-carboxybenzoylamino)-isophthalic acid

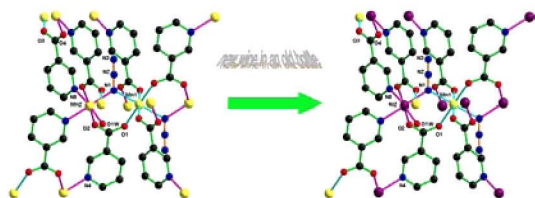
Wen Zhao, Li-Juan Zhang, Xiao-Li Zhao
page 250



Solvothermal reactions of tricarboxylate ligand H_3L with $\text{Cd}^{2+}/\text{Ln}^{3+}$ has yielded a series of new MOFs containing interesting structural motifs.

Novel heterometallic metal–azido complex synthesized by “one-step” reaction: synthetic strategy and magnetic properties

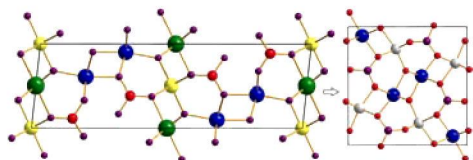
Yong-Kun Jiao, Xiu-Ping Li, Cui Zhao, Hai-Chao Wang, Min Xue, Jiong-Peng Zhao, Fu-Chen Liu
page 257



A novel heterometallic 3D complex $[\text{Ni}_2\text{Mn}(\text{N}_3)_2(\text{nic})_4 \cdot (\text{H}_2\text{O})_2]_n$ (1) (nic = nicotinate) was synthesized by hydrothermal reaction. This complex exhibits interesting structural and magnetic properties.

Crystal structures of two novel borate compounds MgInBO_4 and $\text{MgIn}_{7/8}\text{B}_{7/8}\text{O}_{29/8}$

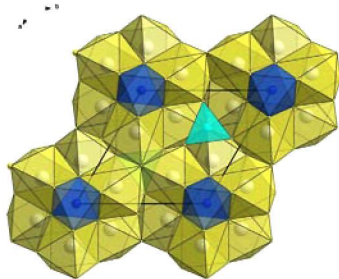
H.K. Li, G.M. Cai, J.J. Fan, Z.P. Jin, T.T. Zhou, X.L. Chen
page 262



The structural transformation from the monoclinic $\text{MgIn}_{7/8}\text{B}_{7/8}\text{O}_{29/8}$ ($P12_1/n1$) to the orthorhombic MgInBO_4 ($Pnma$).

$\text{Ln}_3\text{FeGaQ}_7$: A new series of transition-metal rare-earth chalcogenides

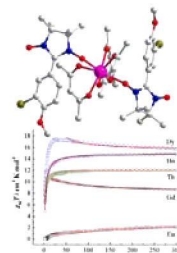
Wenlong Yin, Wendong Wang, Lei Kang, Zheshuai Lin, Kai Feng, Youguo Shi, Wenyu Hao, Jiyong Yao, Yicheng Wu
page 269



$\text{Ln}_3\text{FeGaQ}_7$ adopt a three-dimensional framework composed of LnQ_7 monocapped trigonal prisms with interesting $[\text{FeS}_3]^{4-}$ chains and isolated GaQ_4 tetrahedra lying in two sets of channels in the framework.

Syntheses, crystal structures, magnetic and luminescence properties of five novel lanthanide complexes of nitronyl nitroxide radical

Ya-Li Wang, Yuan-Yuan Gao, Yue Ma, Qing-Lun Wang, Li-Cun Li, Dai-Zheng Liao
page 276



Using a novel halogen phenyl-substituted nitronyl-nitroxide radical, we obtained and characterized five isostructural lanthanide mononuclear tri-spin compounds.

Role of dopants in $\text{LiF}:\text{Mg,Cu}$, $\text{LiF}:\text{Mg,P}$ and $\text{LiF}:\text{Mg,Cu,P}$ detectors

Kh. Mohammadi, A. Moussavi Zarandi, H. Afarideh, S. Shahmaleki
page 282

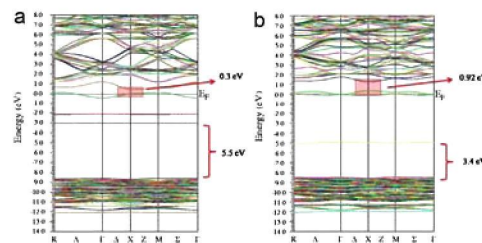
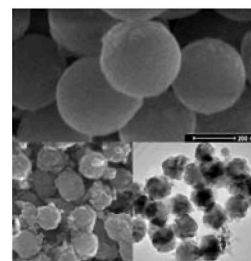


Figure (a) and (b) shows changes in electronic structure and band gap energy of LiF crystal due to presence of Mg and Cu, Mg and P ions respectively.

Carbonaceous spheres—an unusual template for solid metal oxide mesoscale spheres: Application to ZnO spheres

Greta Patrinoiu, Jose Maria Calderón-Moreno, Daniela C. Culita, Ruxandra Birjega, Ramona Ene, Oana Carp
page 291

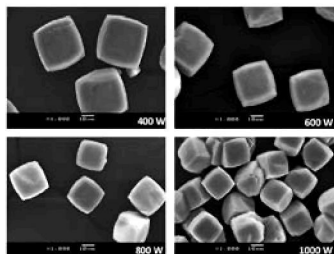


A novel and eco-friendly methodology for the synthesis of mesoscale solid ZnO spheres was developed. The protocol involves a double coating of the starch-derived carbonaceous spheres with successive layers of zinc-containing species by alternating a non-ultrasound and ultrasound-assisted deposition, followed by calcination treatments.

Synthesis and characterization of zinc borophosphates with ANA-zeolite framework by the microwave method

Yu Song, Ling Ding, Qingda An, Shangru Zhai, Xiaowei Song

page 300

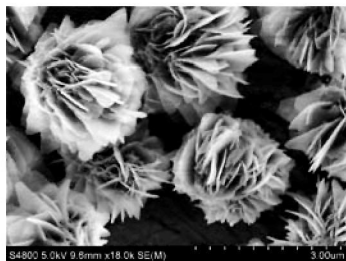


Tailor-made ANA zeolites with varied size can be prepared by simply changing the reaction power.

Synthesis of flower-like Boehmite (γ -AlOOH) via a one-step ionic liquid-assisted hydrothermal route

Zhe Tang, Jilei Liang, Xuehui Li, Jingfeng Li, Yunqi Liu, Chenguang Liu

page 305

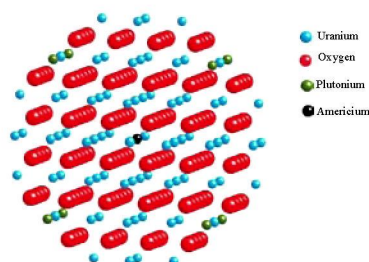


The flower-like γ -AlOOH architectures composed by nanosheets with narrow size distribution (1.6–2.2 μm) and uniform pore size (6.92 nm) have been synthesized via a one-step ionic liquid-assisted hydrothermal route.

Americium characterization by X-ray fluorescence and absorption spectroscopy in plutonium uranium mixed oxide

Claude Degueldre, Cedric Cozzo, Matthias Martin, Daniel Grolimund, Cyprian Mieszczyński

page 315

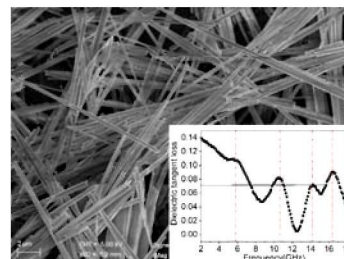


Americium L_{III} XAFS spectra recorded for the irradiated MOX sub-sample in the rim zone for a $300 \mu\text{m} \times 300 \mu\text{m}$ beam size area investigated over six scans of 4 h. The records remain constant during multi-scan. The analysis of the XAFS signal shows that Am is found as trivalent in the UO_2 matrix. This analytical work shall open the door of very challenging analysis (speciation of fission product and actinides) in irradiated nuclear fuels.

Multiple nonlinear dielectric resonance of ultra-long silver trimolybdate nanowires

Guang-Sheng Wang, Bo Wen, Shuai He, Lin Guo and Mao-Sheng Cao

page 320



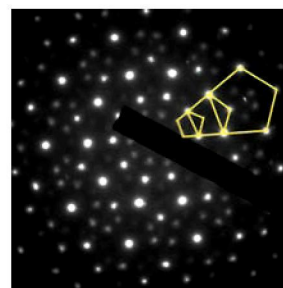
The untralong silver trimolybdate nanowires were synthesized and the dielectric properties of the products were studied from 2 to 18 GHz. The as-established equivalent circuit model of the silver molybdate nanowires were employed to explain the nonlinear dielectric resonant behavior.

Rapid Communications

Icosahedral quasicrystalline $(\text{Ti}_{1.6}\text{V}_{0.4}\text{Ni})_{100-x}\text{Sc}_x$ alloys: Synthesis, structure and their application in Ni-MH batteries

Wen Hu, Jianhong Yi, Biju Zheng, Limin Wang

page 1

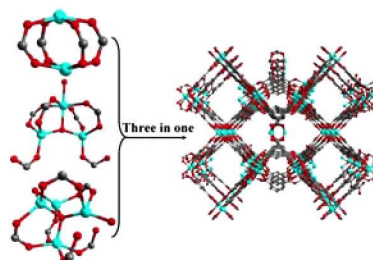


Quasicrystalline Ti–V–Ni–Sc hydrogen storage materials: Sc addition into $\text{Ti}_{1.6}\text{V}_{0.4}\text{Ni}$ alloy forms the icosahedral phase (see picture). With optimal Sc dosage, the anodic cycling stability and self-discharge property are greatly enhanced.

A new zinc-1,3,5-benzenetricarboxylate framework integrated three distinct subunits (SBUs)

Yi-Ming Xie

page 116

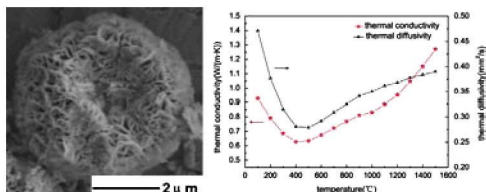


Presented here is a new zinc-1,3,5-benzenetricarboxylate framework integrated three distinct subunits (SBUs).

Synthesis of multi-hierarchical structured yttria-stabilized zirconia powders and their enhanced thermophysical properties

Fengmei Cao, Yanfeng Gao, Hongfei Chen, Xinling Liu, Xiaoping Tang, Hongjie Luo

page 168



There are many tiny pores and grain boundaries in the multi-hierarchical structured yttria-stabilized zirconia (YSZ) powders, which greatly decrease the thermal conductivities of the YSZ powders.

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