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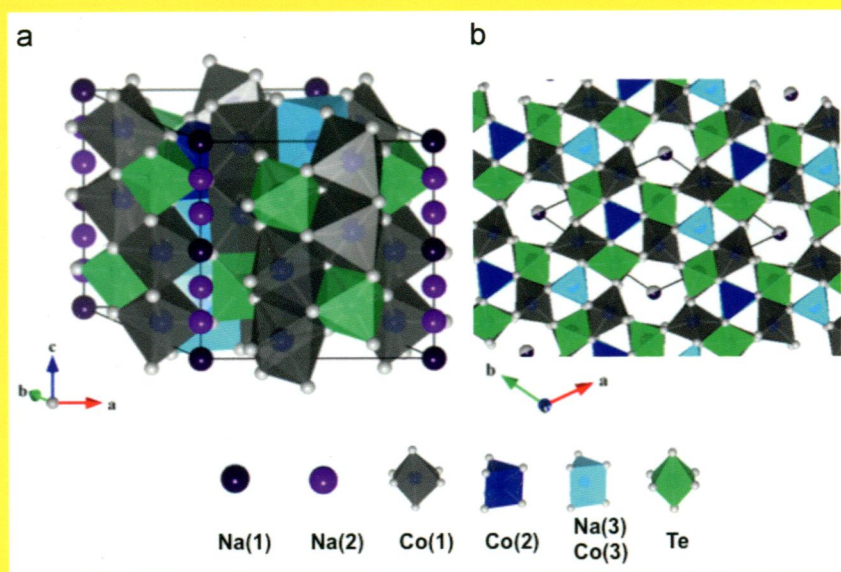
J. LI

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H.-C. ZUR LOYE

IN THIS ISSUE:

**Synthesis, structure, and magnetic properties of the
novel sodium cobalt tellurate $\text{Na}_5\text{Co}_{15.5}\text{Te}_6\text{O}_{36}$**



**Yue Jin Shan, Yuta Yoshioka, Makoto Wakeshima,
Keitaro Tezuka and Hideo Imoto**

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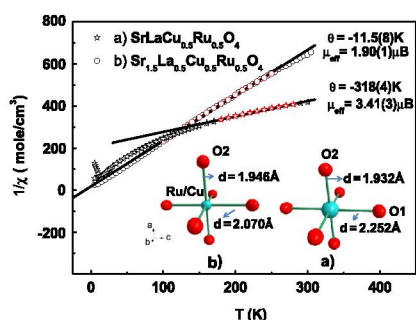
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Regular Articles

Crystal structure, oxidation state and magnetism of $\text{Sr}_x\text{La}_{2-x}\text{Cu}_{0.5}\text{Ru}_{0.5}\text{O}_4$ ($x=1, 1.5$)

Minfeng Lü, Xiaolong Deng, João C. Waerenborgh, Xiaojie Wu and Jian Meng
page 1

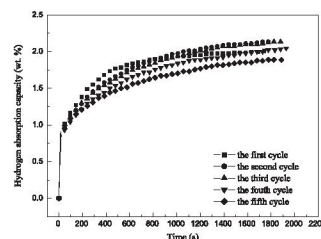


$\text{SrLaCu}_{0.5}\text{Ru}_{0.5}\text{O}_4$ with K_2NiF_4 -type structure show a larger static Jahn–Teller distortion than $\text{Sr}_{1.5}\text{La}_{0.5}\text{Cu}_{0.5}\text{Ru}_{0.5}\text{O}_4$, which may be related to stronger antiferromagnetic superexchange interactions.

Regular Articles—Continued

Effect of MoS_2 on hydrogenation storage properties of LiBH_4

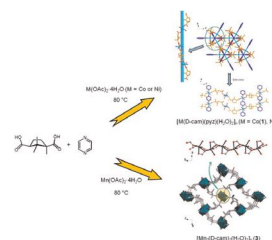
Dan Liang, Shumin Han, Jiasheng Wang, Wei Zhang, Xin Zhao and Ziyang Zhao
page 21



Hydrogen absorption curves of LiBH_4 doped with MoS_2 for five cycles at 400 °C.

Three new homochiral coordination polymers involving two three-dimensional structural architectures: Syntheses, structures and magnetic properties

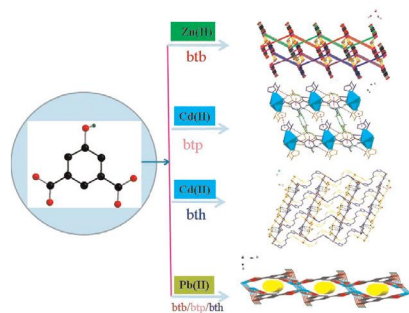
Tzu-Ling Chao and Chen-I. Yang
page 25



The preparations and properties of three new homochiral three-dimensional (3D) coordination polymers, $[\text{M}(\text{D-cam})(\text{pyz})(\text{H}_2\text{O})_2]_n$ ($\text{M}=\text{Co}$ (1) and Ni (2); $\text{D-H}_2\text{cam}=(+)$ D-camphoric acid; $\text{pyz}=\text{pyrazine}$) and $[\text{Mn}_2(\text{D-cam})_2(\text{H}_2\text{O})_2]$ (3), under solvothermal conditions is described. Single-crystal X-ray diffraction analyses revealed that all of compounds are homochiral 3D structure. 1 and 2 are isostructural and crystallize in the trigonal space group $P3_221$, while 3 crystallizes in monoclinic space group $P2_1$. The structure of 1 and 2 consists of metal- D-cam helical chains which are pillared with pyrazine ligands into a 3D framework structure and 3 features a 3D homochiral framework involving one-dimensional manganese-carboxylate chains that are aligned parallel to the b axis. Magnetic susceptibility data of all compounds were collected. The findings indicate that μ_2 -pyrazine dominate weak antiferromagnetic coupling within 1 and 2, while 3 exhibits antiferromagnetic behavior through the carboxylate groups of D-cam ligand.

Synthesis, structures and properties of a family of four two-dimensional coordination polymers constructed from 5-hydroxyisophthalate

Kou-Lin Zhang, Jing-Bo Zhang, Chu-Yue Jing, Lei Zhang, Richard I. Walton, Peizhi Zhu and Seik Weng Ng
page 8

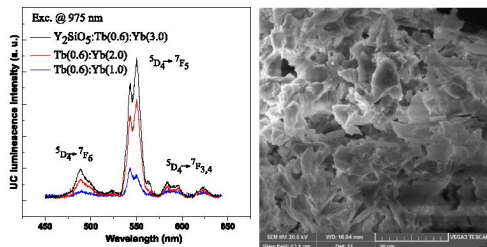


Among four 2D CPs reported, 1 is an unusual 2D→3D polythreaded framework. 4 exhibits 2D double-layered binodal (4, 4)-net containing nanochannels. Reversible dehydration–rehydration is observed in 1, 2 and 4.

Continued

Cooperative upconversion luminescence in Tb³⁺:Yb³⁺ co-doped Y₂SiO₅ powders prepared by combustion synthesis

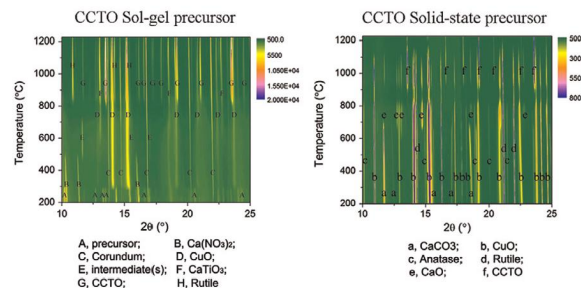
Nikifor Rakov, Simone A. Vieira, Renato B. Guimarães and Glauco S. Maciel
page 32



Left: Cooperative upconversion luminescence spectra of three powder samples prepared by combustion synthesis. Right: The SEM image of the powder showing that it consists of agglomerated flake-like shaped particles of various sizes. Full scale bar is 20 μm.

Investigation of phase evolution of CaCu₃Ti₄O₁₂ (CCTO) by *in situ* synchrotron high-temperature powder diffraction

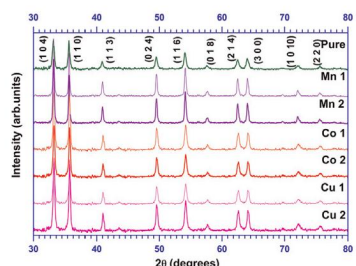
Xin Ouyang, Saifang Huang, Weijun Zhang, Peng Cao, Zhaohui Huang and Wei Gao
page 58



The *in situ* synchrotron HT-XRD patterns of CCTO sol-gel and solid-state precursor.

Preparation and structural, optical, magnetic, and electrical characterization of Mn²⁺/Co²⁺/Cu²⁺ doped hematite nanocrystals

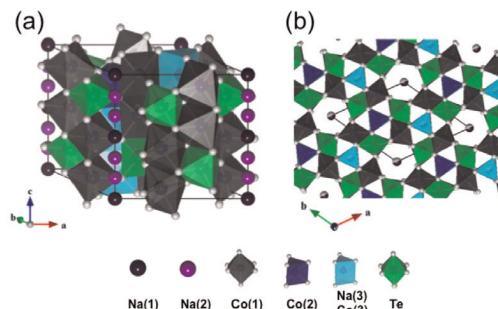
S.I. Srikrishna Ramya and C.K. Mahadevan
page 37



The indexed X-ray diffraction (XRD) patterns of all the seven nanocrystals indicate the rhombohedral structure of hematite (JCPDS card No.13-0534). No impurity phase like oxides of Mn or Co or Cu was detected above equipment limit. The average crystallite (grain) sizes estimated using the Scherrer's formula.

Synthesis, structure, and magnetic properties of the novel sodium cobalt tellurate Na₅Co_{15.5}Te₆O₃₆

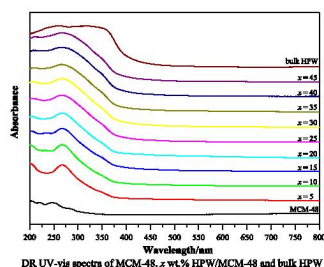
Yue Jin Shan, Yuta Yoshioka, Makoto Wakeshima, Keitaro Tezuka and Hideo Imoto
page 63



The unit cell (a) and perspective view along [001] (b) of novel single crystal oxide, Na₅Co_{15.5}Te₆O₃₆.

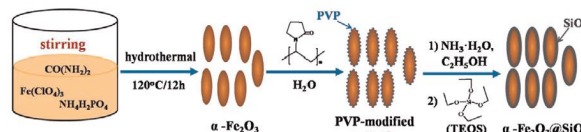
Preparation, characterization and catalytic properties of MCM-48 supported tungstophosphoric acid mesoporous materials for green synthesis of benzoic acid

Hai-Yan Wu, Xiao-Li Zhang, Xi Chen, Ya Chen and Xiu-Cheng Zheng
page 51



Preparation and thermal stability of the spindle α-Fe₂O₃@SiO₂ core-shell nanoparticles

Xin Zhang, Yongan Niu, Yang Li, Yao Li and Jiupeng Zhao
page 69

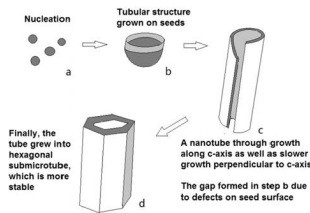


Schematic of preparation of the monodisperse spindle α-Fe₂O₃@SiO₂ nanoparticles (NPs).

Indium telluride nanotubes: Solvothermal synthesis, growth mechanism, and properties

Liyan Zhou, Shancheng Yan, Tao Lu, Yi Shi, Jianyu Wang and Fan Yang

page 75

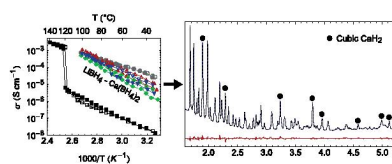


A convenient solvothermal approach was applied to synthesize In_2Te_3 nanotubes, which has not been reported in the literature for our knowledge. Surface area of this material is $137.85 \text{ m}^2 \text{ g}^{-1}$ from the BET testing, and such a high value makes it probably suitable for gas sensing and hydrogen storage, compared with the nanowires. The nanotube device also has a broad light detection range from 300 nm to 1100 nm, covering the UV-visible-NIR region. This good performance of In_2Te_3 nanotubes may enable significant advancements of new photodetection and photosensing applications.

Ionic conductivity and the formation of cubic CaH_2 in the $\text{LiBH}_4\text{-Ca}(\text{BH}_4)_2$ composite

Dadi Sveinbjörnsson, Didier Blanchard, Jon Steinar Gardarsson Myrdal, Reza Younesi, Rasmus Viskinde, Marit Dalseth Riktor, Poul Norby and Tejs Vegge

page 81

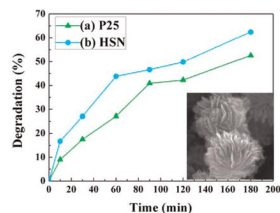


An Arrhenius plot of the ionic conductivity of the $\text{LiBH}_4\text{-Ca}(\text{BH}_4)_2$ composites (red, blue, green). The ionic conductivity of ball milled (gray) and non-milled (black) LiBH_4 is shown for comparison. The filled symbols are measured during heating runs and the empty symbols are measured during subsequent cooling runs. The conductivity of the composites is in all cases higher during cooling, most probably due to the formation of an electronically conducting layer containing defect-rich cubic CaH_2 . Such layer formation could eventually lead to a short circuit in the cell and reveals a general issue of chemical stability that should be attended to in the development of solid electrolyte materials.

A novel 3D structure composed of strings of hierarchical TiO_2 spheres formed on TiO_2 nanobelts with high photocatalytic properties

Yongjian Jiang, Meicheng Li, Dandan Song, Xiaodan Li and Yue Yu

page 90

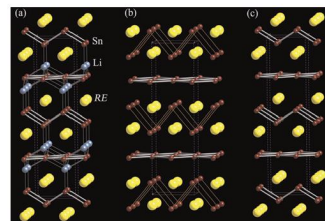


Novel TiO_2 with anatase micro-spheres and rutile nanobelts is synthesized. Enhanced photocatalysis is attributed to hierarchical structures (3D spheres), conductive channel (1D nanobelts) and large specific surface area (2D nanosheet).

The RELi_xSn_2 ($\text{RE}=\text{La-Nd}$, Sm, and Gd; $0 \leq x < 1$) series revisited. Synthesis, crystal chemistry, and magnetic susceptibilities

Julien P.A. Makongo, Nian-Tzu Suen, Shengping Guo, Shanta Saha, Richard Greene, Johnpierre Paglione and Svilen Bobev

page 95

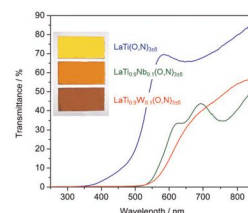


RELi_xSn_2 ($\text{RE}=\text{La-Nd}$, $0 \leq x < 1$) crystallize in a defect variants of the CeNiSi_2 structure type (a). The Sn-disorder and the Li-deficiency correlate, and vary monotonically with the decreased size of the rare-earth atoms in the order $\text{RE}=\text{La-Nd}$. The SmSn_2 (b) and GdSn_2 (c) structures are devoid of any disorder.

Optical and transport properties of $\text{LaTi}_{1-x}\text{M}_x(\text{O,N})_{3\pm\delta}$ ($x=0; 0.1$, $\text{M}=\text{Nb}^{5+}$, W^{6+}) thin films prepared by plasma ammonolysis

Alexandra E. Maegli, Leyre Sagarna, Sascha Populoh, Bartosz Penkala, Eugenio H. Otal and Anke Weidenkaff

page 106

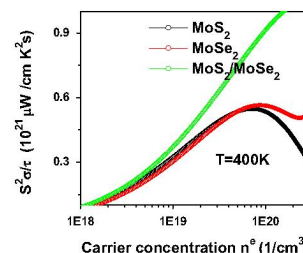


The synthesis of $\text{LaTi}_{1-x}\text{M}_x(\text{O,N})_{3\pm\delta}$ ($x=0; 0.1$, $\text{M}=\text{Nb}^{5+}$, W^{6+}) thin films by microwave-induced plasma ammonolysis is described and changes of their optical and transport properties upon B-site substitution are discussed.

Density functional theory investigation of the electronic structure and thermoelectric properties of layered MoS_2 , MoSe_2 and their mixed-layer compound

Changhoon Lee, Jisook Hong, Wang Ro Lee, Dae Yeon Kim and Ji Hoon Shim

page 113

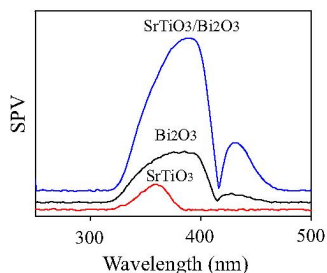


On the basis of density functional calculations we predict that the mixed-layer compounds $2\text{H-MoS}_2/2\text{H-MoSe}_2$, in which two different layers 2H-MoS_2 and 2H-MoSe_2 , have enhanced thermoelectric properties because of the increased density of states around the Fermi level and the decreased band gap size.

Continued

Contributions of conduction band offset to the enhanced separation efficiency of photoinduced charges for SrTiO₃/Bi₂O₃ heterojunction semiconductor

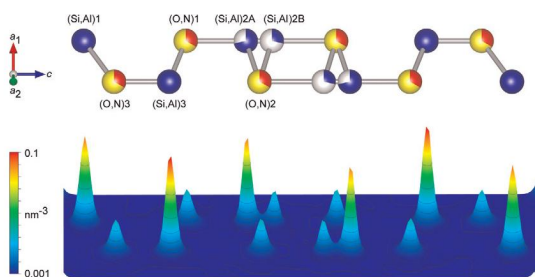
Zhenlong Zhang, Jichun Zhu, Shengjun Li and Yanli Mao
page 120



Enhanced separation efficiency for SrTiO₃/Bi₂O₃ is resulting from the energy difference between the conduction band edges.

Electron density distribution and disordered crystal structure of 15R-SiAlON, SiAl₄O₂N₄

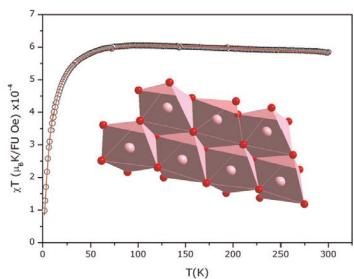
Hiroki Banno, Takaaki Hanai, Toru Asaka, Koji Kimoto and Koichiro Fukuda
page 124



A bird's eye view of electron densities up to 75.3% (0.133 nm⁻³) of the maximum on the plane parallel to (110) with the corresponding atomic arrangements of SiAl₄O₂N₄.

Synthesis, characterization and magnetic properties of a manganese (II) silicate containing frustrated S=5/2 zig-zag ladders

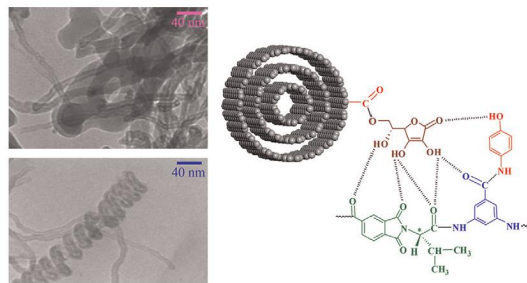
P. Brandão, A.M. dos Santos, L.S. Paixão and M.S. Reis
page 130



A manganese silicate prepared hydrothermally with formula NaMn₂Si₃O₈(OH) possessing the structure of the mineral Serandite contains doubled chains of edge-sharing MnO₆ octahedra. The magnetic susceptibility was measured and shows an antiferromagnetic behavior.

A convenient strategy to functionalize carbon nanotubes with ascorbic acid and its effect on the physical and thermomechanical properties of poly(amide-imide) composites

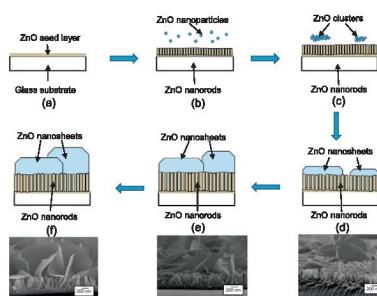
Shadpour Mallakpour and Amin Zadehnazari
page 136



Presentation of possible interactions of hydrogen bonding between the MWCNT-AS and the PAI chains.

Synthesis of ZnO nanorod-nanosheet composite via facile hydrothermal method and their photocatalytic activities under visible-light irradiation

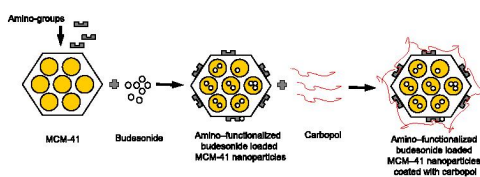
Wai Kian Tan, Khairunisak Abdul Razak, Zainovia Lockman, Go Kawamura, Hiroyuki Muto and Atsunori Matsuda
page 146



Schematic illustration of ZnO nanorod-nanosheet composite structure formation by hydrothermal at low-temperature of 80 °C against time.

Functionalized mesoporous silica nanoparticles for oral delivery of budesonide

K. Yoncheva, M. Popova, A. Szegedi, J. Mihaly, B. Tzankov, N. Lambov, S. Konstantinov, V. Tzankova, F. Pessina and M. Valoti
page 154

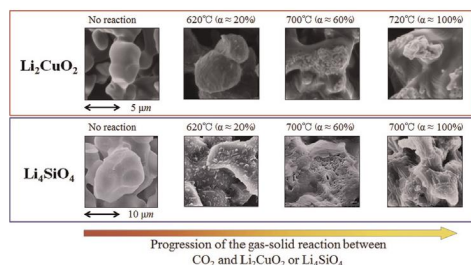


Silica mesoporous MCM-41 particles were amino-functionalized, loaded with budesonide and post-coated with bioadhesive polymer (carbopol) in order to achieve prolonged residence of anti-inflammatory drug in GIT.

Fundamental research on gas–solid reaction between CO₂ and Li₂CuO₂ linking application for solid CO₂ absorbent

Katsuyoshi Oh-ishi, Yusuke Matsukura, Takeshi Okumura, Yuuki Matsunaga and Ryota Kobayashi

page 162

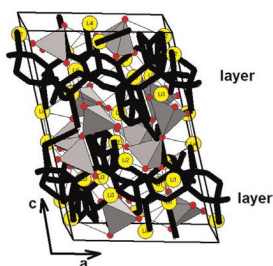


Surface changes of Li₂CuO₂ and Li₄SiO₄ particles by progression of the gas–solid reactions between CO₂ and these oxides.

Lithium-cation conductivity and crystal structure of lithium diphosphate

V.I. Voronin, E.A. Sherstobitova, V.A. Blatov and G.Sh. Shekhtman

page 170

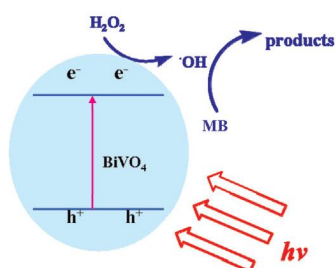


Crystal structure of Li₄P₂O₇ at 950 K. Red balls represent oxygen atoms; black lines show Li⁺ ion migration channels in the layers perpendicular to [001] direction.

Controlled synthesis of T-shaped BiVO₄ and enhanced visible light responsive photocatalytic activity

Shuying Dong, Chongfei Yu, Yukun Li, Yihui Li, Jianhui Sun and Xiaofei Geng

page 176

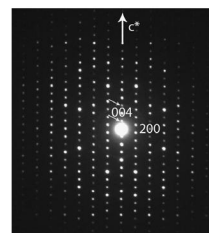


H₂O₂ molecules function as electron trapping reagent to react with *e*⁻ to enhance the photocatalytic degradation efficiency of MB in the BiVO₄/H₂O₂ system under visible light irradiation.

Synthesis, crystal structure and electronic properties of the new iron selenide Ba₉Fe₄Se₁₆

David Berthebaud, K.R.S. Preethi Meher, Denis Pelloquin and Antoine Maignan

page 184

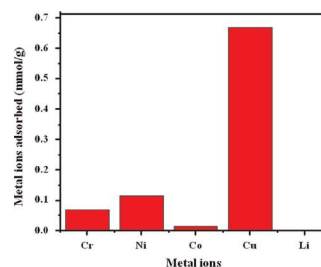


Experimental electron diffraction (ED) patterns of Ba₉Fe₄Se₁₆ recorded along *a*-[010].

Fast, selective adsorption of Cu²⁺ from aqueous mixed metal ions solution using 1,4,7-triazacyclononane modified SBA-15 silica adsorbent (SBA-TACN)

Pradip Kumar Tapaswi, Madhappan Santha Moorthy, Sung Soo Park and Chang-Sik Ha

page 191

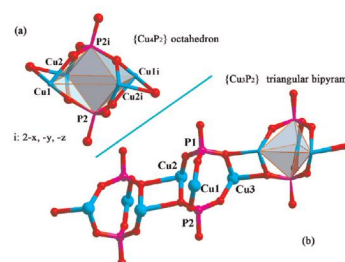


A new SBA-15 supported 1,4,7-triazacyclononane (TACN) modified mesoporous silica (SBA-TACN) adsorbent has been developed which shows excellent selectivity in Cu²⁺ adsorption from aqueous mixed metal ion solutions at pH 5. The copper ion adsorption capacity of the SBA-TACN can reach a maximum value of 0.67 mmol/g. The adsorbent is stable enough to be used at least for three cycles.

Synthesis and characterization of two polyoxometalates consisting of different Cu-ligand hydrogen phosphate units

Jinshuang Yan, Xiaofang Zhao, Jiao Huang, Kaining Gong, Zhangang Han and Xueliang Zhai

page 200

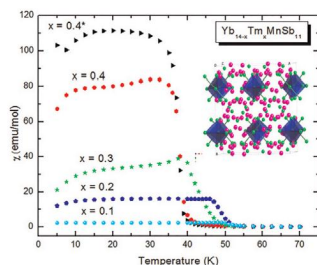


Two polyoxometalate-based supramolecular compounds consisting of different linkages based on Cu-ligand and HPO₄²⁻ groups have been synthesized and characterized. The photocatalytic activity are studied.

Continued

Yb_{14-x}Tm_xMnSb₁₁ (0 < x < 0.5): Structure and magnetic properties

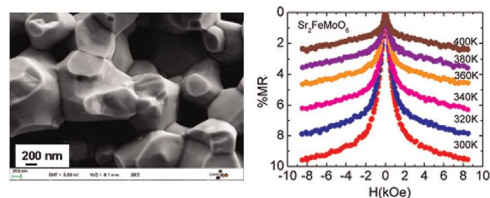
John H. Roudebush, Jason Grebenkemper, Yufei Hu, Nasrin Kazem, M.N. Abdusalyamova and Susan M. Kauzlarich
page 206



Magnetic susceptibility (χ) for Yb_{14-x}Tm_xMnSb₁₁ at $H_a = 0.01$ T as a function of temperature along with a view of the structure.

Low-field magnetoresistance up to 400 K in double perovskite Sr₂FeMoO₆ synthesized by a citrate route

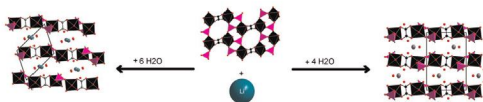
L. Harnagea, B. Jurca and P. Berthet
page 219



The microstructure (left panel) and corresponding low-field magnetoresistance of one of the Sr₂FeMoO₆ samples synthesized in the course of this work.

Lithium vanadyl oxalatophosphate: Influence of the water content on the crystal structures and the dehydration scheme

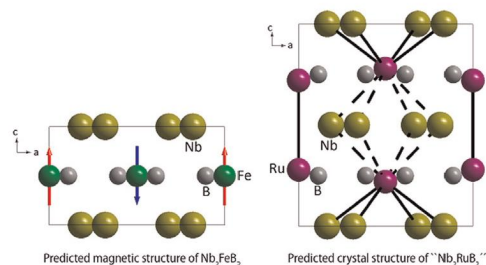
S. Auguste, V. Alonzo, T. Bataille, L. Le Pollès, W. Cañón-Mancisidor, D. Venegas-Yazigi and E. Le Fur
page 212



Two new lithium vanadyl oxalatophosphites layered compounds, Li₂(VOHPO₃)₂C₂O₄·6H₂O (**1**) and Li₂(VOHPO₃)₂C₂O₄·4H₂O (**2**) have been hydrothermally synthesized. Lithium ions and water molecules are located between the anionic [(VO)₂(HPO₃)₂C₂O₄]²⁻ layers. Thermal behaviors were carefully studied by thermogravimetric and thermal dependant X-ray diffraction. Various intermediate phases were evidenced and for both compounds the final product was LiVOPO₄.

Electronic, structural and magnetic studies of niobium borides of group 8 transition metals, Nb₂MB₂ (M=Fe, Ru, Os) from first principles calculations

Rachid St. Touzani and Boniface P.T. Fokwa
page 227



Nb₂FeB₂ (U₃Si₂ structure type, space group *P4/mbm*, no. 127) is predicted to order antiferromagnetically, due to the presence of iron chains which show ferromagnetic interactions in the chains and antiferromagnetic interactions between them. "Nb₂RuB₂" is predicted to crystallize with the recently discovered Nb₂OsB₂ twofold superstructure (space group *P4/mnc*, no. 128) of U₃Si₂ structure type. The building of ruthenium dumbbells instead of chains along [001] is found to be responsible for the stabilization of this superstructure.

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