

VOLUME 37 NUMBER 8  
AUGUST 2019

ISSN: 1002-0721  
CODEN JREAE 6

# *Journal of* **Rare Earths**



万方数据



## CONTENTS

## INVITED REVIEW

- Recent progress of energy transfer and luminescence intensity boosting mechanism in Nd<sup>3+</sup>-sensitized upconversion nanoparticles ..... Solomon Tiruneh Dibaba, Xiaoqian Ge, Wei Ren, Lining Sun 791

## SPECTROSCOPY, LUMINESCENCE AND PHOSPHORS

- Photoluminescence properties of Eu<sup>3+</sup>-doped MgAl<sub>2</sub>O<sub>4</sub> nanoparticles in various surrounding media ..... I.E. Kolesnikov, E.V. Golyeva, E.V. Borisov, E. Yu Kolesnikov, E. Läderanta, A.V. Kurochkin, M.D. Mikhailov 806
- Impact of grain size, Pr<sup>3+</sup> concentration and host composition on non-contact temperature sensing abilities of polyphosphate nano- and microcrystals ..... S. Gharouel, L. Marciniak, A. Lukowiak, W. Strek, K. Horchani-Naifer, M. Férid 812

## RARE EARTH CATALYSIS

- Effect of synthesis time on morphology of CeO<sub>2</sub> nanoparticles and Au/CeO<sub>2</sub> and their activity in oxidative steam reforming of methanol ..... Srisin Eaimsumang, Sujitra Wongkasemjit, Sangobtip Pongstabodee, Siwaporn Meejoo Smith, Sukritthira Ratanawilai, Nuwong Chollacoop, Apanee Luengnaruemitchai 819
- Hydrothermal and sulfur aging of CeTi/CeWTi catalysts for selective catalytic reduction of NO<sub>x</sub> with NH<sub>3</sub> ..... Lei Chen, Ding Wang, Jiadao Wang, Duan Weng, Li Cao 829
- Influence of calcination temperature for LaTi<sub>0.2</sub>Fe<sub>0.8</sub>O<sub>3</sub> on catalytic pyrolysis of bagasse lignin ..... Haiying Wang, Hongjing Han, Yanan Zhang, Jinxin Li, Yanguang Chen, Hua Song, Enhao Sun, Hongzhi Zhao, Mei Zhang, Dandan Yuan 837
- Enhanced photocatalytic activity of Gd<sup>3+</sup> doped TiO<sub>2</sub> and Gd<sub>2</sub>O<sub>3</sub> modified TiO<sub>2</sub> prepared via ball milling method ..... Di Wu, Chen Li, Dashuai Zhang, Lili Wang, Xiaopeng Zhang, Zaifeng Shi, Qiang Lin 845
- A novel n-CeO<sub>2</sub>/n-CdO heterojunction nanocomposite for enhanced photodegradation of organic pollutants under visible light irradiation ..... Karunamoorthy Saravanakumar, Subramani Muthupoongodi, Velluchamy Muthuraj 853

## MAGNETISM AND MAGNETIC MATERIALS

- Effects of cerium substitution on phase components, microstructures and magnetic properties of Nd-Fe-Ti-B alloy ..... Haijun Peng, Yang Luo, Yakun Dou, Xinyuan Bai, Wenlong Yan, Dunbo Yu, Yuanfei Yang, Shulin Diao 861
- Dependence of magnetic properties on microstructure and composition of Ce-Fe-B sintered magnets ..... Longlong Xi, Anhua Li, Haibo Feng, Min Tan, Wei Sun, Minggang Zhu, Wei Li 865
- Effect of dysprosium substitution on magnetic and structural properties of NiFe<sub>2</sub>O<sub>4</sub> nanoparticles ..... M.A. Almessiere, Y. Slimani, S. Güner, A. Baykal, I. Ercan 871

## ADVANCED RARE EARTH MATERIALS

- First-principles study of structure, mechanical and optical properties of La- and Sc-doped Y<sub>2</sub>O<sub>3</sub> ..... Xian Zhang, Sen Gao, Wenhua Gui, Qingfeng Zeng 879

## CHEMISTRY AND HYDROMETALLURGY

- Non-ammonia enrichment of rare earth by magnesium oxide from rare earth leaching liquor in magnesium salt system ..... Li Huang, Guohua Gao, Ran Wu, Qian Zhang, Fuguo Lai, Yanfei Xiao 886

## RARE EARTH APPLICATIONS

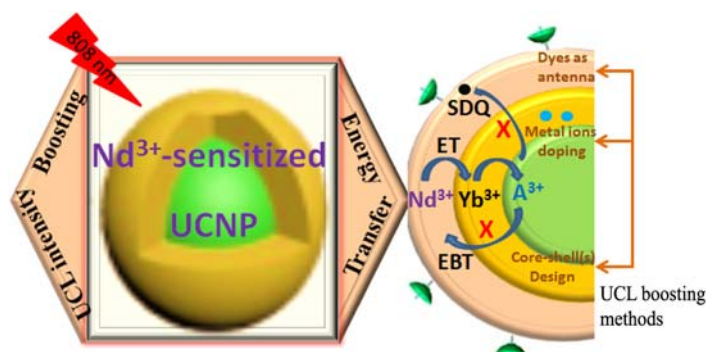
- Lanthanum elicitation on hypocrellin A production in mycelium cultures of *Shiraia bambusicola* is mediated by ROS generation ..... Cansong Lu, Yanjun Ma, Jianwen Wang 895

## CONTENTS

## INVITED REVIEW

- 791 Recent progress of energy transfer and luminescence intensity boosting mechanism in  $\text{Nd}^{3+}$ -sensitized upconversion nanoparticles

Solomon Tiruneh Dibaba, Xiaoqian Ge,  
Wei Ren, Lining Sun



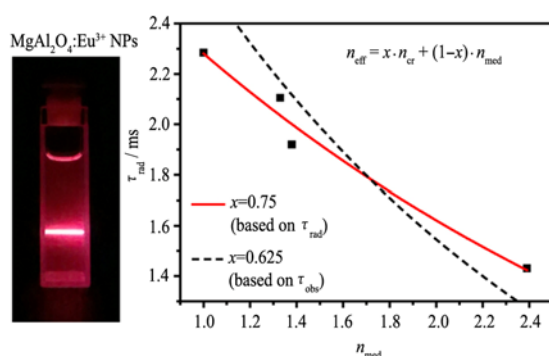
In this review article, photon energy harvesting and transferring mechanisms in  $\text{Nd}^{3+}$ ,  $\text{Yb}^{3+}$  and activator ions ( $\text{A}^{3+}$ ) co-doped  $\text{Nd}^{3+}$ -sensitized UCNPs under 808 nm excitation are briefly discussed. Factors affecting UCL intensity and the counter strategies that have been used recently to boost the UCL intensity are also addressed

*J. Rare Earths*, (37) 2019: 791-805

## SPECTROSCOPY, LUMINESCENCE AND PHOSPHORS

- 806 Photoluminescence properties of  $\text{Eu}^{3+}$ -doped  $\text{MgAl}_2\text{O}_4$  nanoparticles in various surrounding media

I.E. Kolesnikov, E.V. Golyeva, E.V. Borisov,  
E. Yu Kolesnikov, E. Läderanta,  
A.V. Kurochkin, M.D. Mikhailov

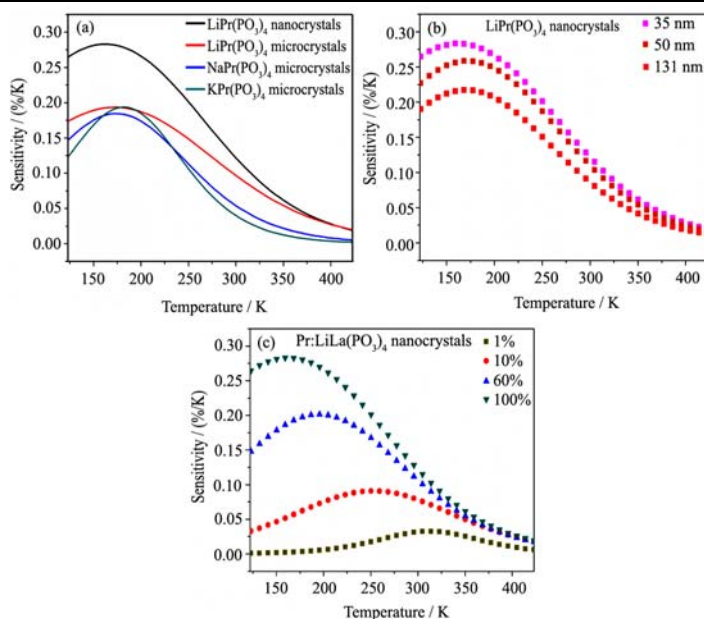


Filling factor of  $\text{MgAl}_2\text{O}_4:\text{Eu}^{3+}$  nanoparticles is defined using both radiative and observed lifetimes

*J. Rare Earths*, (37) 2019: 806-811

- 812 Impact of grain size,  $\text{Pr}^{3+}$  concentration and host composition on non-contact temperature sensing abilities of polyphosphate nano- and microcrystals

S. Gharouel, L. Marciniak, A. Lukowiak,  
W. Strek, K. Horchani-Naifer, M. Férid

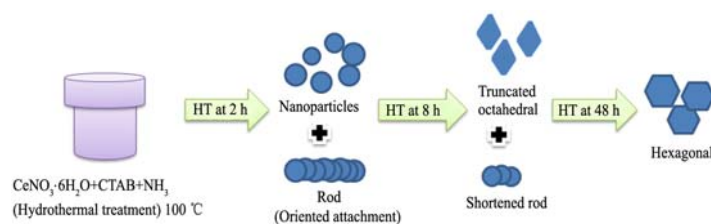


(a) Thermal dependence of sensitivity of  $\text{M}^1\text{Pr}(\text{PO}_3)_4$  microcrystalline powder and  $\text{LiPr}(\text{PO}_3)_4$  nanocrystalline sample annealed at 450 °C; (b) Representative examples of the size effect on the sensitivity of  $\text{LiPr}(\text{PO}_3)_4$  nanocrystals at different temperatures; (c) Thermal evolution of sensitivity for different dopant concentration in  $\text{LiLa}_{1-x}\text{Pr}_x(\text{PO}_3)_4$  nanocrystals

*J. Rare Earths*, (37) 2019: 812-818

- 819 Effect of synthesis time on morphology of CeO<sub>2</sub> nanoparticles and Au/CeO<sub>2</sub> and their activity in oxidative steam reforming of methanol

Srisin Eaimsumang, Sujitra Wongkasemjit, Sangobtip Pongstabodee, Siwaporn Meejoo Smith, Sukritthira Ratanawilai, Nuwong Chollacoop, Apanee Luengnaruemitchai

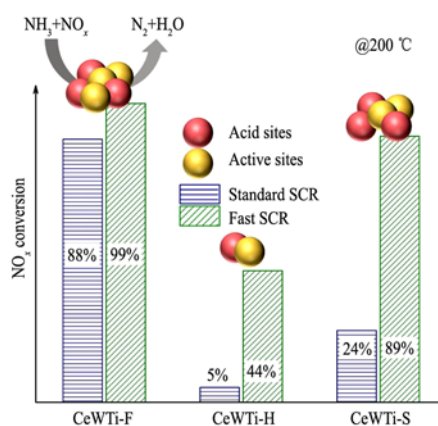


Schematic presentation of ceria synthesized by hydrothermal treatment with CTAB at 100 °C with various synthesis time

*J. Rare Earths*, (37) 2019: 819-828

- 829 Hydrothermal and sulfur aging of CeTi/CeWTi catalysts for selective catalytic reduction of NO<sub>x</sub> with NH<sub>3</sub>

Lei Chen, Ding Wang, Jiadao Wang, Duan Weng, Li Cao



Aging process leads to loss of surface area, redox properties, surface acidities and surface ceria concentration, thus leading to poor performance of NH<sub>3</sub>-NO/NO<sub>2</sub> SCR, especially for the hydrothermal aging

*J. Rare Earths*, (37) 2019: 829-836

- 837 Influence of calcination temperature for LaTi<sub>0.2</sub>Fe<sub>0.8</sub>O<sub>3</sub> on catalytic pyrolysis of bagasse lignin

Haiying Wang, Hongjing Han, Yanan Zhang, Jinxin Li, Yanguang Chen, Hua Song, Enhao Sun, Hongzhi Zhao, Mei Zhang, Dandan Yuan

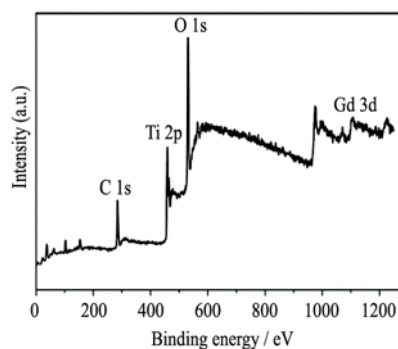


LTF-800 could provide oxygen for the pyrolysis of BL, inhibit decarboxylation and decarbonylation, and avoid oxygen-containing functional groups from being excessively destroyed. The addition of LTF-800 is conducive to the generation of aryl oxygen-containing compounds

*J. Rare Earths*, (37) 2019: 837-844

- 845 Enhanced photocatalytic activity of Gd<sup>3+</sup> doped TiO<sub>2</sub> and Gd<sub>2</sub>O<sub>3</sub> modified TiO<sub>2</sub> prepared via ball milling method

Di Wu, Chen Li, Dashuai Zhang, Lili Wang, Xiaopeng Zhang, Zaifeng Shi, Qiang Lin

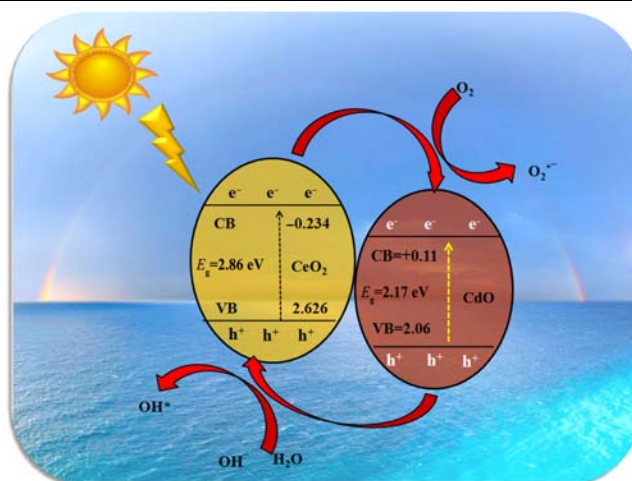


The amount of O<sub>H</sub> in 2.5 mol%Gd<sup>3+</sup>/TiO<sub>2</sub> is 1.55 times higher than that of pure TiO<sub>2</sub>

*J. Rare Earths*, (37) 2019: 845-852

- 853 A novel  $n\text{-CeO}_2/n\text{-CdO}$  heterojunction nanocomposite for enhanced photodegradation of organic pollutants under visible light irradiation

Karunamoorthy Saravanakumar, Subramani Muthupoongodi, Velluchamy Muthuraj



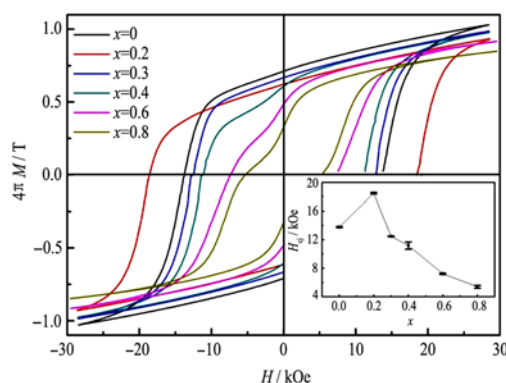
Novel  $n\text{-CeO}_2/n\text{-CdO}$  heterojunction photocatalyst was designed and fabricated via simple ultra-sonication method, which exhibits excellent visible light driven photocatalytic performances due to the formation of  $n\text{-n}$  type heterojunction between  $\text{CeO}_2$  and  $\text{CdO}$  and also the strong visible-light absorption properties

*J. Rare Earths*, (37) 2019: 853-860

## MAGNETISM AND MAGNETIC MATERIALS

- 861 Effects of cerium substitution on phase components, microstructures and magnetic properties of  $\text{Nd-Fe-Ti-B}$  alloy

Haijun Peng, Yang Luo, Yakun Dou, Xinyuan Bai, Wenlong Yan, Dunbo Yu, Yuanfei Yang, Shulin Diao

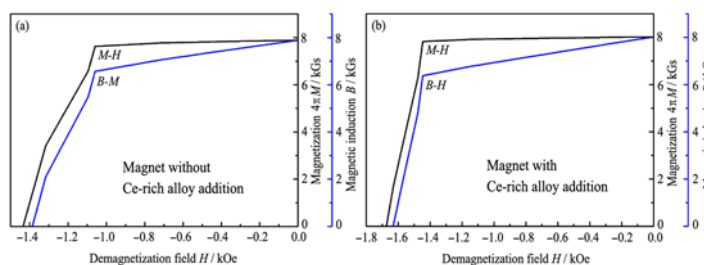


In  $(\text{Nd}_{1-x}\text{Ce}_x)_{12}\text{Fe}_{77}\text{Ti}_5\text{B}_6$  melt spun alloys, the coercivity of the  $(\text{Nd}_{1-x}\text{Ce}_x)_{12}\text{Fe}_{77}\text{Ti}_5\text{B}_6$  alloys reaches maximum first and then decreases with the increase of Ce content. The maximum coercivity is obtained in the sample of 20% Ce substituted which is 34% higher than the Ce-free sample. The hysteresis loops are plump with good squareness and exhibit single hard magnetic behavior when the Ce content is lower than 0.4. While the amounts of Ce contents are rising, the second quadrant of the hysteresis loop collapses because of the formation of  $\text{CeFe}_2$  and  $\text{TbCu}_7$ -type phases in the alloys

*J. Rare Earths*, (37) 2019: 861-864

- 865 Dependence of magnetic properties on microstructure and composition of  $\text{Ce-Fe-B}$  sintered magnets

Longlong Xi, Anhua Li, Haibo Feng, Min Tan, Wei Sun, Minggang Zhu, Wei Li



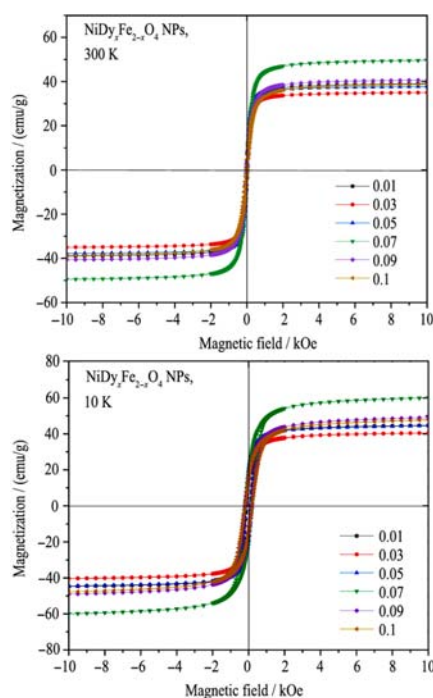
In this work, by adding Cu doped Ce-rich alloy into  $\text{Ce-Fe-B}$  sintered magnets, the magnetic properties of magnets are improved, which is attributed to the increased grain boundary phase and optimized microstructure in the magnet with Ce-rich alloy addition

*J. Rare Earths*, (37) 2019: 865-870

- 871 Effect of dysprosium substitution on magnetic and structural properties of  $\text{NiFe}_2\text{O}_4$  nanoparticles

M.A. Almessiere, Y. Slimani, S. Güner,  
A. Baykal, I. Ercan

*J. Rare Earths*, (37) 2019: 871-878



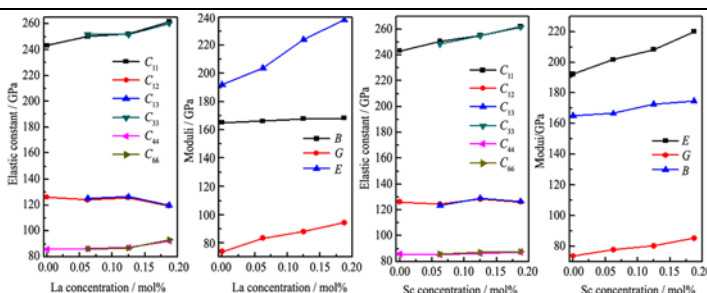
In this paper, we examined the influence of dysprosium (Dy) on the structural, microstructural and magnetic properties of nickel nano spinel ferrite synthesized via the hydrothermal method. The magnetization versus field,  $M(H)$ , curves exhibit superparamagnetic nature at room temperature and ferromagnetic nature at low temperature (10 K). A noticeable improvement in the different deduced magnetic parameters is obtained especially for the  $\text{NiDy}_{0.07}\text{Fe}_{1.93}\text{O}_4$  ( $x=0.07$ ) product

### ADVANCED RARE EARTH MATERIALS

- 879 First-principles study of structure, mechanical and optical properties of La- and Sc-doped  $\text{Y}_2\text{O}_3$

Xian Zhang, Sen Gao, Wenhua Gui,  
Qingfeng Zeng

*J. Rare Earths*, (37) 2019: 879-885



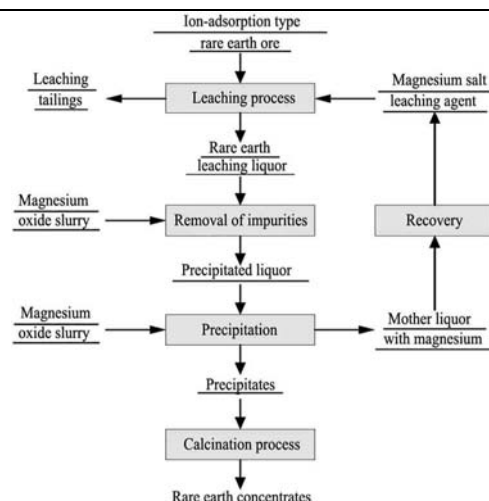
The doping of La or Sc in  $\text{Y}_2\text{O}_3$  is permissible in the preparation of  $\text{Y}_2\text{O}_3$  transparent ceramics and the presence of the R (R= Sc or La) can improve the mechanical properties of  $\text{Y}_{2-x}\text{R}_x\text{O}_3$

### CHEMISTRY AND HYDROMETALLURGY

- 886 Non-ammonia enrichment of rare earth by magnesium oxide from rare earth leaching liquor in magnesium salt system

Li Huang, Guohua Gao, Ran Wu,  
Qian Zhang, Fuguo Lai, Yanfei Xiao

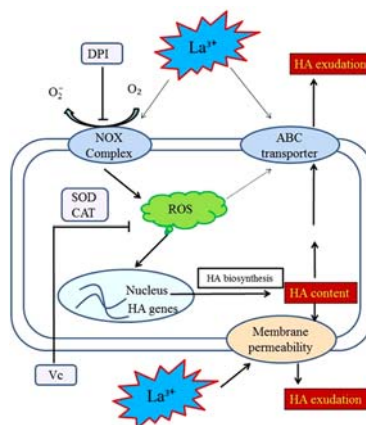
*J. Rare Earths*, (37) 2019: 886-894



In the  $\text{MgO}$  precipitation and high-temperature calcination process, the precipitates containing less impurities were achieved under optimum precipitation condition, and then the rare earth concentrates with a purity of 92.03% could be acquired after the precipitates were calcined at  $1300^\circ\text{C}$  for 2 h. In this method, the raw material cost is low and the quality of rare earth concentrates is acceptable. More importantly, the using of magnesium oxide precipitant can supply the magnesium ions, realize the effective circulation of magnesium elements, and finally solve the problem of ammonia nitrogen in the extraction process of the ion-adsorption type rare earth ore

- 895 Lanthanum elicitation on hypocrellin A production in mycelium cultures of *Shiraia bambusicola* is mediated by ROS generation

Cansong Lu, Yanjun Ma, Jianwen Wang



1.0 g/L La<sup>3+</sup> not only increases HA content by 2.50-fold in mycelia, but stimulates HA exudation to the medium. La<sup>3+</sup> can induce the intracellular ROS (reactive oxygen species) accumulation. The elicitation of La<sup>3+</sup> on HA production is mediated by ROS generation for up-regulating both HA biosynthetic genes for HA accumulation and ATP-binding cassette transporter gene (*BsABC*) for HA exudation

*J. Rare Earths*, (37) 2019: 895-902