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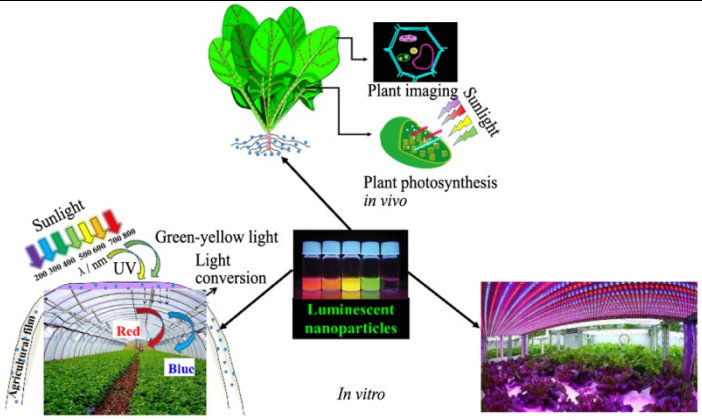
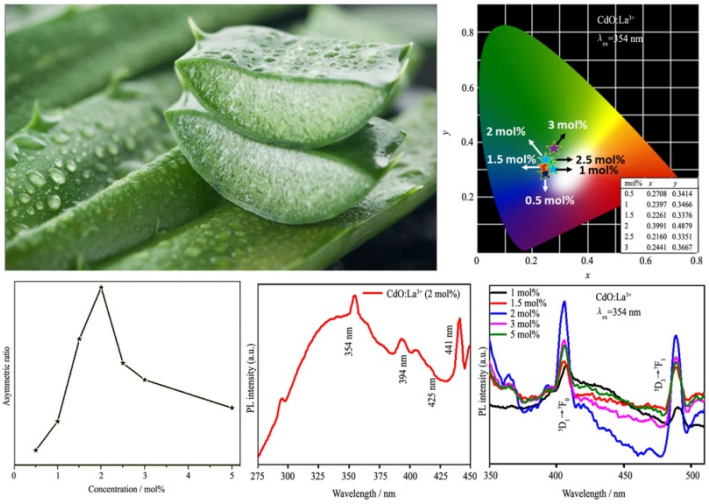
INVITED REVIEW

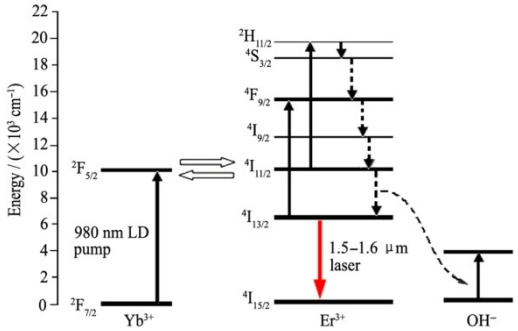


Recent developments in luminescent nanoparticles application for plant imaging and photosynthesis are reviewed

SPECTROSCOPY, LUMINESCENCE AND PHOSPHORS



La^{3+} doped CdO nanophosphors were synthesised via green mediated solution combustion route. Synthesized nanoparticles were characterised using PXRD and XPS. The photoluminescence emission spectra reveal the blue-green light emission which was further analysed with CIE chromaticity diagram. J-O analysis was done to estimate the 4f-4f electron interaction in La^{3+} ions. The synthesis method is eco-friendly, fast and efficient. The photometric results indicate that the optimized phosphor is highly useful in WLEDs

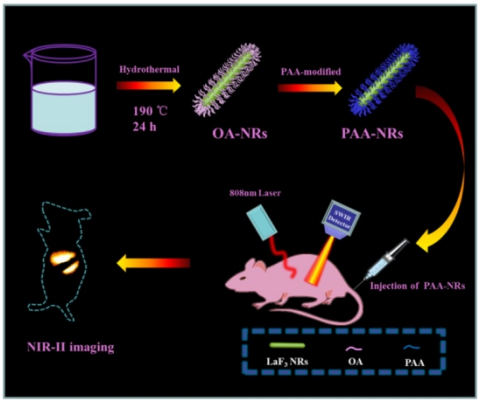


This figure shows the schematic energy level diagram of Yb^{3+}, Er^{3+}, OH^- and the energy transfer route from Er^{3+} to OH^- ion. As the energy of the OH^- stretching vibration (3300–3600 cm^{-1}) is approximately equal to the energy gap between the $^4I_{11/2}$ and $^4I_{13/2}$ of levels of Er^{3+}, nonradiative relaxation from $^4I_{11/2}$ to $^4I_{13/2}$ level can easily occur by excitation of one OH^- vibration quantum. And thus, OH^- ions can shorten the fluorescence lifetime of the $^4I_{11/2}$ level by the phonon-assisted cross-relaxation process between the Er^{3+} and OH^- ions

931 *In vivo* optical bioimaging by using Nd-doped LaF_3 luminescent nanorods in the second nearinfrared window

Shouyan Cheng, Liu Liu, Qiuhua Yang, Youbin Li, Songjun Zeng

J. Rare Earths, (37) 2019: 931-936

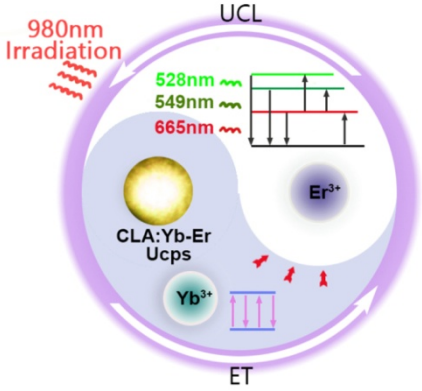


High-performance PAA-modified $LaF_3:Nd^{3+}$ NRs with efficient NIR-II emission were successfully developed. *In vivo* NIR-II fluorescent bioimaging based on PAA-modified $LaF_3:Nd^{3+}$ NRs was achieved, providing a new possibility for disease diagnosis

937 Highly sensitive up-conversion phosphor for optical thermometry: $CaLaAl_3O_7:Er^{3+}/Yb^{3+}$

Peng Gao, Xu Li, Yi Gong, Guangming Shen, Suheng Zhang, Li Guan

J. Rare Earths, (37) 2019: 937-942

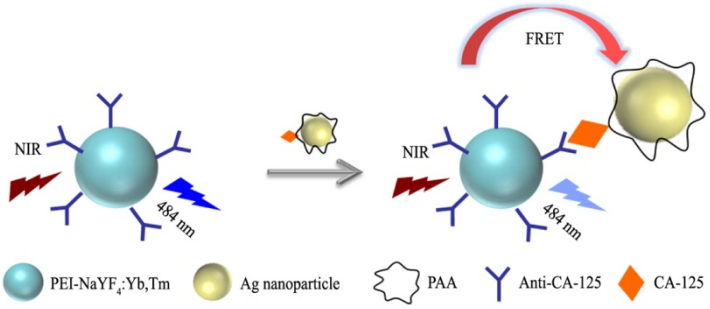


Schematic diagram of upconversion in the $CaLaAl_3O_7$:Yb-Er system upon irradiation at 980 nm

943 Up-conversion fluorescence biosensor for sensitive detection of CA-125 tumor markers

Jingshi Liu, Sai Xu, Liheng Sun, Songtao Hu, Jiao Sun, Min Liu, Cui Ma, Haipeng Liu, Ziqing Wang, Ying Yang, Biao Dong, Decheng Hong

J. Rare Earths, (37) 2019: 943-948

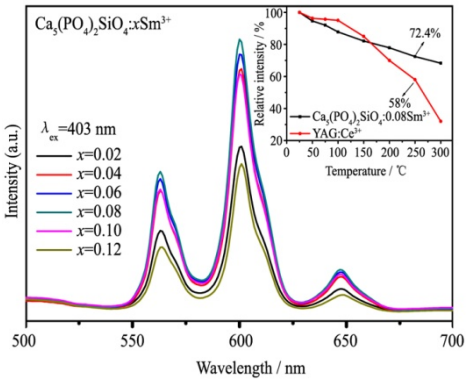


In this tumor marker sensing system, CA-125 was labeled with silver NPs which show very high absorption efficiency with the upconversion blue emission of Tm^{3+} ($NaYF_4$:Yb/Tm). When they are bound together by the linkage of the tumor markers, and upconversion energy transfer can occur efficiently. From the variation of fluorescent signal, tumor marker concentration can be effficiently

949 Samarium doped apatite-type orange-red emitting phosphor $Ca_5(PO_4)_2SiO_4$ with satisfactory thermal properties for n-UV w-LEDs

Ze Zhang, Jialiang Niu, Wei Zhou, Dingdian Xu, Huanhuan Du

J. Rare Earths, (37) 2019: 949-954

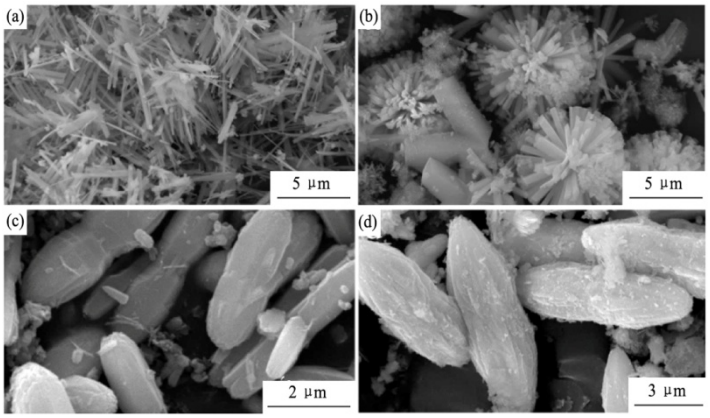


A series of single-phase Sm^{3+} activated $Ca_5(PO_4)_2SiO_4$ phosphors were successfully fabricated via a conventional solid-state method, which can be efficiently excited by near ultraviolet (n-UV) light with a high internal QE (74.54%) and satisfactory thermal properties for n-UV w-LEDs

955 Controllable synthesis of Eu^{3+} ions doped Zn(OH)F and ZnO micro-structures: Phase, morphology and luminescence property

Zhiyuan Chen, Jingbin Huang, Yanyan Wang, Dan Yue, Zhenling Wang, Jingyang Niu

J. Rare Earths, (37) 2019: 955-960



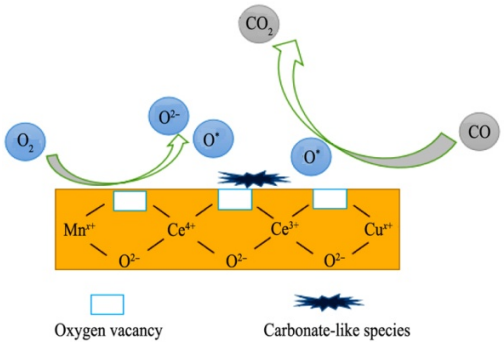
Controllable synthesis of Eu^{3+} doped Zn(OH)F (a, b) and ZnO (c, d) luminescent micro-structures with various morphologies

RARE EARTH CATALYSIS

961 Catalytic oxidation of CO on mesoporous codoped ceria catalysts: Insights into correlation of physicochemical property and catalytic activity

Hongjian Zhu, Yingying Chen, Yibo Gao, Wenxu Liu, Zhongpeng Wang, Chenchen Cui, Wei Liu, Liguo Wang

J. Rare Earths, (37) 2019: 961-969

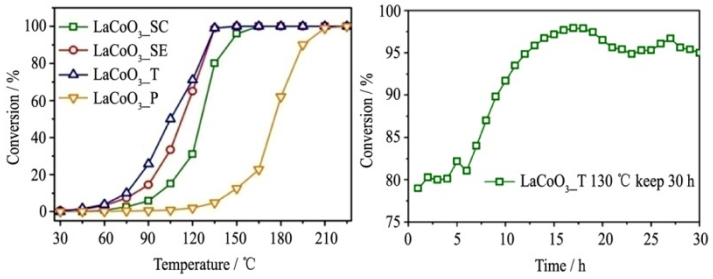


The improved activity of MnCuCe would be mainly attributed to the formed highly reactive oxygen species and available active sites, which mainly derive from the increased oxygen vacancies. The surface adsorbed carbonate species more tend to decompose into CO_2, creating reactive sites again

970 Effect of preparation method on physicochemical properties and catalytic performances of $LaCoO_3$ perovskite for CO oxidation

Shan Wang, Xuelian Xu, Junjiang Zhu, Duihai Tang, Zhen Zhao

J. Rare Earths, (37) 2019: 970-977



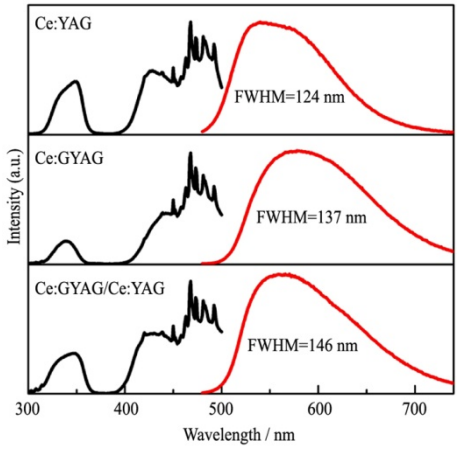
$LaCoO_3$ prepared by carbon templating method shows good activity for CO oxidation and the activity can be increased from 80% to 96% after 13 h in the long-term stability test and be remained thereafter

ADVANCED RARE EARTH MATERIALS

978 Fabrication of Ce-doped $(Gd_2Y)Al_5O_{12}$/ $Y_3Al_5O_{12}$ composite-phase scintillation ceramic

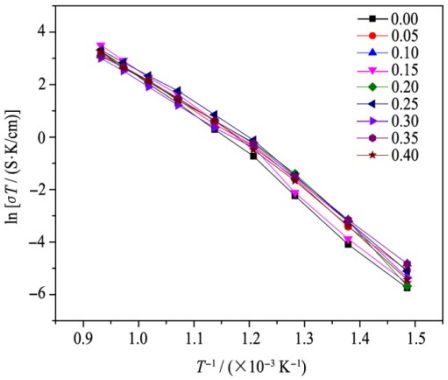
Shuilin Chen, Benxue Jiang, Yang Wang, Qiangqiang Zhu, Qinghua Yang, Wanqiu Ma, Ge Zhang, Long Zhang

J. Rare Earths, (37) 2019: 978-983



The emission spectra of the ceramics reveal that the Ce:GYAG/Ce:YAG sample exhibits a broader full-width-at-half-maximum (FWHM) (146 nm) than those of the Ce:YAG (124 nm) and Ce:GYAG (137 nm) samples. A broad range of emission band was observed between 500 and 750 nm in the composite ceramic, compared with the YAG and GYAG ceramics

984 Synthesis and characterization of tungsten and barium co-doped $La_2Mo_2O_9$ by sol-gel process for solid oxide fuel cells

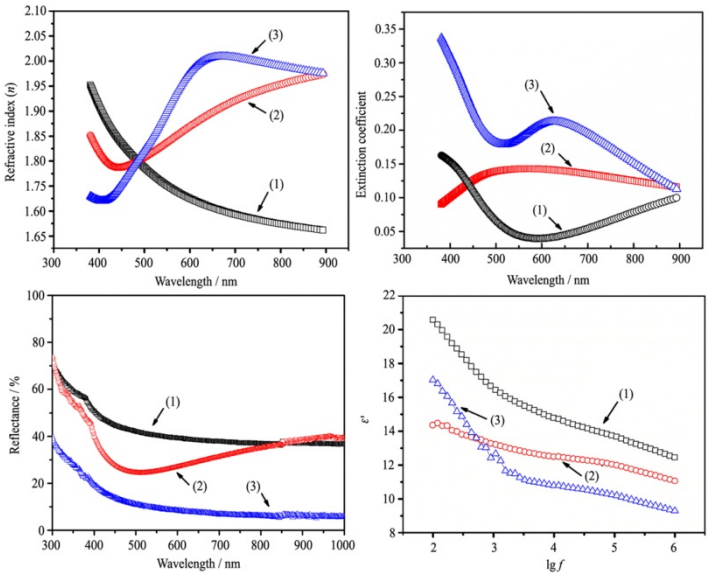


Single phase ultrafine $La_{1.9}Ba_{0.1}Mo_{2-x}W_xO_{8.95}$ powders were synthesized. The as-synthesized powders exhibit high sintering activity. $La_{1.9}Ba_{0.1}Mo_{1.85}W_{0.15}O_{8.95}$ has the highest oxide ionic conductivity

Chang'an Tian, Lingbo Shao, Dongdong Ji, Jie Yang, Jinsong Xie, Qiyi Yin, Huirong Le

J. Rare Earths, (37) 2019: 984-988

989 Magnetron sputtered Dy_2O_3 with chromium and copper contents for antireflective thin films with enhanced absorption



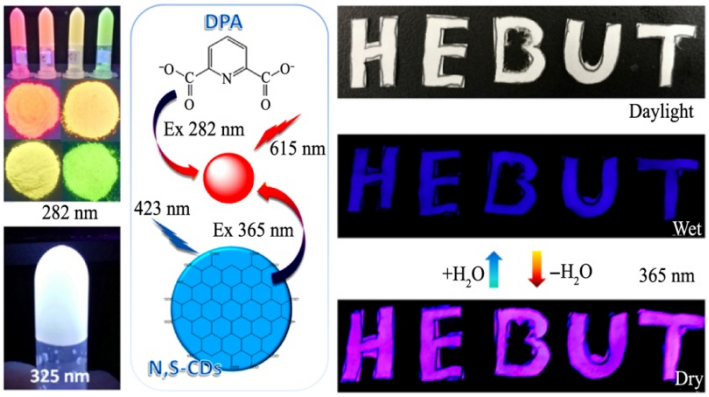
Chromium (Cr) and copper (Cu) containing Dy_2O_3 thin films were fabricated using magnetron sputtering for improved anti-reflecting mechanism. Cr and Cu are considered as good absorbers for anti-reflective or protective coating layers. A significant variation was observed in physical properties including an enhanced absorption in (a) Dy_2O_3 thin films with addition of (b) Cr and (c) Cu contents

Shahid M. Ramay, Asif Mahmood, Hamid M. Ghaithan, Nasser S. Al-Zayed, Adnan Aslam, Abdullah Murtaza, Nisar Ahmad, Saadat A. Siddiqi, Murtaza Saleem

J. Rare Earths, (37) 2019: 989-994

CHEMISTRY AND HYDROMETALLURGY

995 Aminoclay decorated with lanthanide complexes and carbon dots: Tunable emission and information encryption



Luminescent hybrid materials of hosting lanthanide complexes and carbon dots in aminoclay were successfully prepared, showing great potential in fabricating optoelectronic devices like WLEDs and in information encryption

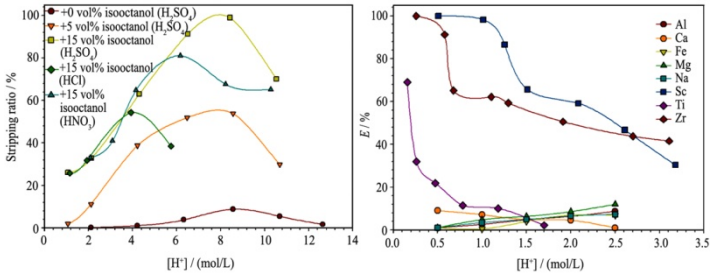
Tianren Wang, Jing Yang, Huanrong Li, Yige Wang

J. Rare Earths, (37) 2019: 995-1001

1002 Application of P507 and isooctanol extraction system in recovery of scandium from simulated red mud leach solution

Chuanying Liu, Li Chen, Ji Chen, Dan Zou, Yuefeng Deng, Deqian Li

J. Rare Earths, (37) 2019: 1002-1008



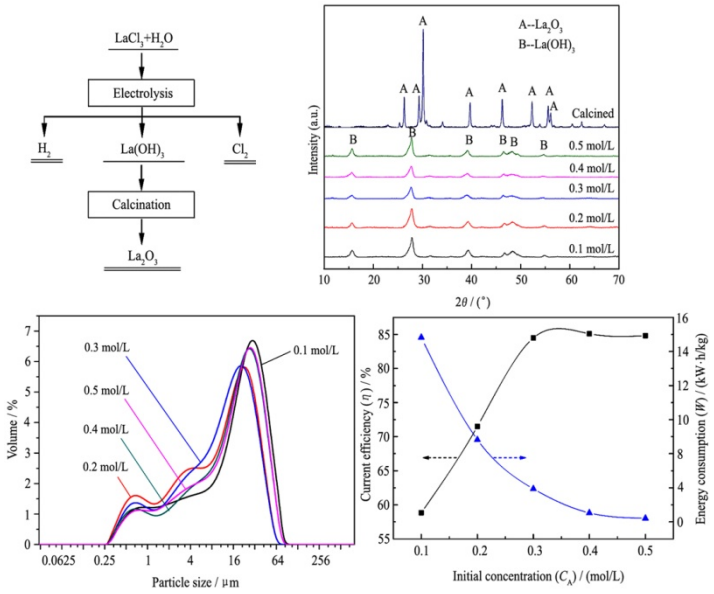
The stripping of Sc from P507 by sulfuric acid is improved by the addition of isooctanol. The P507 with isooctanol extraction system also has high selectivity to Sc from other elements in the red mud

METALLOGRAPHY AND PYROMETALLURGY

1009 Preparation of La_2O_3 by ion-exchange membrane electrolysis of $LaCl_3$ aqueous solution

Deliang Meng, Qiuyue Zhao, Xijuan Pan, Ting'an Zhang

J. Rare Earths, (37) 2019: 1009-1014



The product formed by electrolysis of $LaCl_3$ aqueous solution directly is $La(OH)_3$, after calcining, La_2O_3 is obtained eventually. The produced gases (Cl_2 and H_2) are of high purity, which can be collected respectively, and used as value-added products or further synthesis of hydrochloric acid (HCl). The hydrochloric acid and the used electrolyte can be returned to the total production process of rare earth to achieve the purpose of recycling