Electronic Supplementary Material (ESI) for RSC Advances

Blue-fluorescence-assisted $SrTi_{1-x}Cr_yO_3$ for efficient persistent photocatalysis

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Experimental

1. Preparation of composite photocatalysts

In the present research, $SrTi_{1-x}Cr_yO_3$ nanoparticles were synthesized by microwave-assisted solvothermal reactions of $SrCl_2$, $Cr(NO_3)_3$ and $Ti(OC_3H_7)_4$ in KOH aqueous solutions at 200°C for 3 h[1]. Then, the obtained $SrTi_{1-x}Cr_yO_3$ nanoparticles were mixed with desired amounts of $CaAl_2O_4$:(Eu,Nd) powders by a planetary ball milling at 200 rpm for 20 min.

2. Photocatalytic degradation characterization

The photocatalytic activity of the as-prepared $CaAl_2O_4$:(Eu,Nd)/$SrTi_{1-x}Cr_yO_3$ composite was evaluated for the oxidative destruction of NO using a flow type reactor by measuring the concentration of NO gas at the outlet of the reactor (373 cm^3 of internal volume) during the photo-irradiation of a constantly flowing 1 ppm NO/50 vol.% air mixed (balance N_2) gas (200 $cm^3 \cdot min^{-1}$). 0.16 g of the sample was placed in the area of a hollow of $40 \times 30 \times 0.5$ mm on a glass

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holder plate and set in the bottom center of the reactor[2]. An artificial solar light consisted of a compact xenon lamp with 69.7 W/m^2 of light intensity was used as the light source. Before light irradiation, the NO gas was continuously flowed through the reactor for 10 min to achieve adsorption balance. Then, the light was irradiated for 30 min to realize the steady status of the photocatalytic NO degradation and let long afterglow phosphor $CaAl_2O_4$:(Eu,Nd) absorb enough exciting energy. After that, the light was switched off, while the NO gas was flowed further for 180 min.

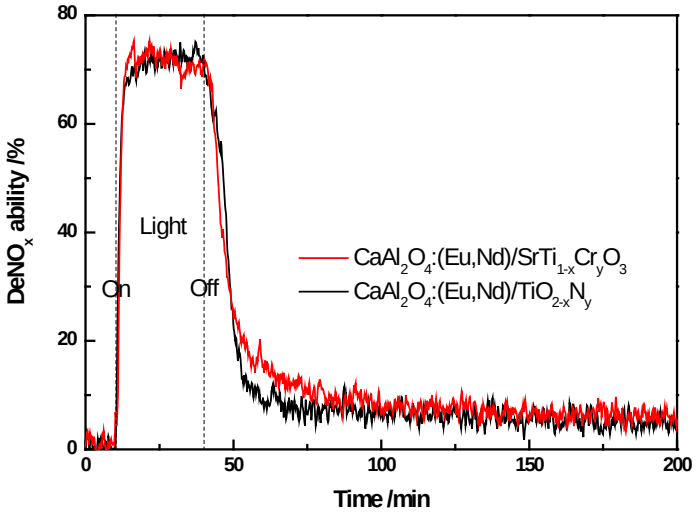

Fig. S1. Photocatalytic NO destruction activity of $CaAl_2O_4$:(Eu, Nd)/$SrTi_{1-x}Cr_yO_3$ and $CaAl_2O_4$:(Eu, Nd)/$TiO_{2-x}N_y$ composite during artificial solar light irradiation with light intensity of 69.7 W/m^2 for 30 min, followed by turning off light.

Reference

1. U. Sulaeman, S. Yin, and T. Sato, *Appl. Phys. Lett.*, 2010, **97**, 103102.

2. S. Yin, H. Hasegawa, D. Maeda, M. Ishitsuka, and T. Sato, *J. Photoch. Photobio. A: Chem.*, 2004, **163**, 1.