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Optimization of Optical Properties of Oxynitrides through control of the Stoichiometries

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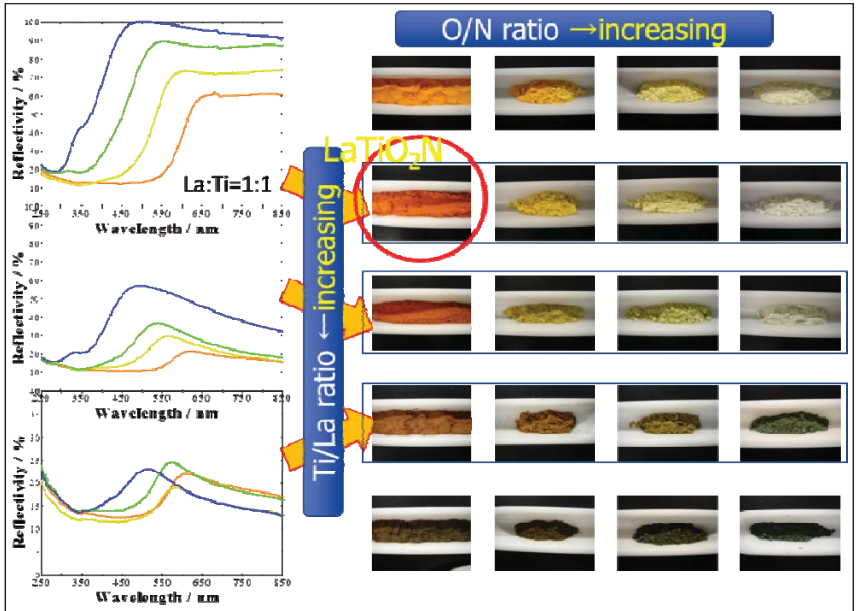

Fig. 1 Color tuning in $LaTiO_2N$ via control of anion and cation stoichiometries.

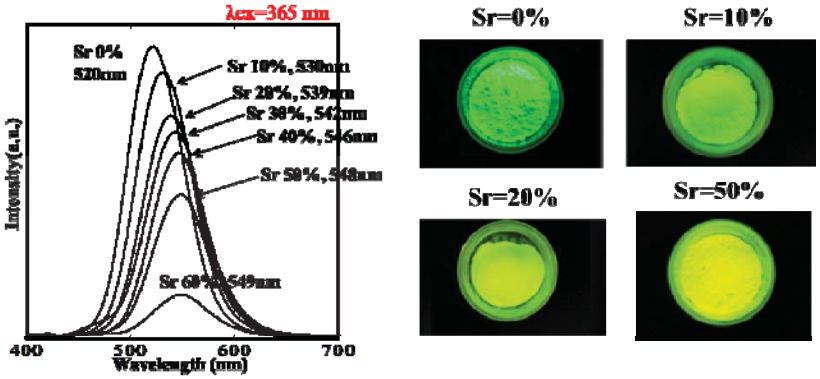

Fig. 2 Redshift of emission for $Ba_3Si_6O_{12}N_2$:Eu-type phosphors by substitution of Ba by Sr.

Content:

We have demonstrated that a color of the perovskite-type $LaTiO_2N$ oxynitride could be tuned from orange through yellow and green to pale gray or white by proper adjustment of the O/N ratio. (Moriga et al., *phys. stat. sol.* (a), 203, 2818 (2006)), whereas increasing Ti/La ratio deteriorates the reflectivity after the absorption edge (Moriga et al., *J. Ceram. Soc. Jpn.*, 115, 637 (2007)). We are now trying to make a redder or bluer oxynitride powders by partial substitution of the constituent cations, and by controlling of the cation and/or anion stoichiometries as well.

Oxynitride phosphors are recently spotlighted as yellow or red phosphors for white LEDs because oxynitrides have no toxicity, blue light are available for excitation source and oxynitrides possess low thermal quenching behavior, compared with oxide phosphors. We have found that $Ba_3Si_6O_{12}N_2$:Eu-type phosphors showed considerable redshift in emission wavelengths from 520nm for the Sr-free oxynitride up to 550nm for 50%-substituted oxynitride by Sr, with increasing Sr content.

Keywords : Perovskite oxynitrides, oxynitride phosphors,

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