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Authors address: Times New Roman 12, non-italic, non-bold, centered
Authors Email: Times New Roman 12, non-italic, non-bold, centered

This is the abstract text: Times New Roman 12 non-italic non-bold, simple spacing, no blank line before and after paragraphs. Margins : 3 cm. top, 2.5 cm. bottom, right and left**. 2-page length**.

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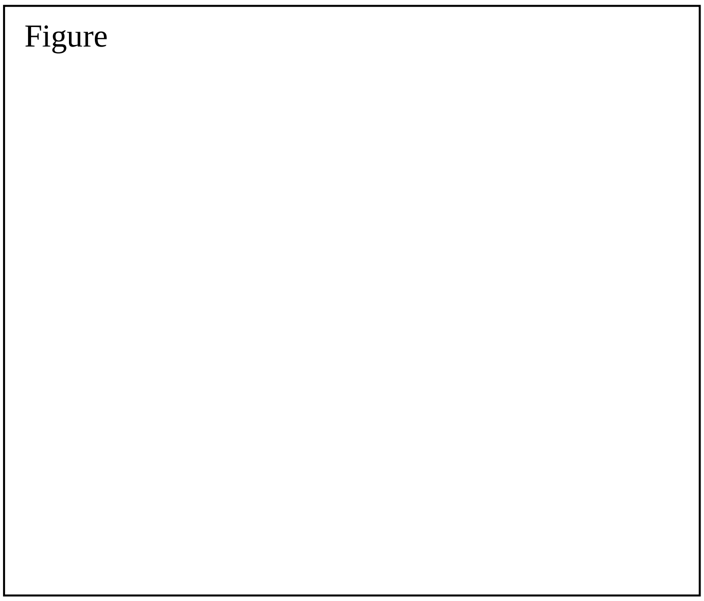

Fig. 1 Schematic illustration of the apparatus.

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Table 1 Schematic illustration of the apparatus.

Table

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Table 2 Schematic illustration of the

Table

References

[1] M. Takashima and G. Kano, *Solid State Ionics* **23** (1987), p. 99.
[2] M. Takashima, S. Yonezawa, K. Horita, K. Ohwaki and H. Takahashi, *J. Mater. Chem.* **6** (1996), p. 795.

Example

Fluoride Compounds Containing Rare Earth Elements as Functional Materials

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Because of the similar ionic size of fluoride and oxide ion, fluoride ion can substitute or incorporate for oxide ion or vacant site in the metal oxides. Therefore, the bond character and the coordination in the crystal structure must be controlled by introducing of F^- into the metal oxides with partially covalent M–O bond. From this concept, the binary rare-earth oxide fluorides, $Ln_2Ln'_2O_3F_6$ in which Ln and Ln′ are different rare earths, have been investigated as oxide ion-conducting solid electrolytes with much higher conductivity than that of stabilized zirconia [1-4]. Here, $Ln_2Eu_2O_3F_6$ were synthesized by the solid-state reaction between 1 mol Ln_2O_3 (Ln: La, Nd) and 2 mol EuF_3 at 1000–1200 °C in a highly dry atmosphere. $Nd_2Eu_2O_3F_6$ exhibits the oxide ion conductivity of 2.0 S m^{-1} at 500 °C under P_{O2} = 0.4 Pa, and the transport numbers τO^{2-} was 0.9 at a temperature ranging from 500 to 700 °C. X-ray diffraction Rietveld analysis revealed $Nd_2Eu_2O_3F_6$ was the monoclinic lattice (Fig.1) with the crystal parameters a_0 = 0.396 nm, b_0 = 1.13 nm, c_0 = 0.562 nm, b = 134.8°, Z = 1. The structures of $Nd_{2.1}Eu_{1.9}O_3F_6$ and $La_2Eu_2O_3F_6$ were also analyzed as the monoclinic structure (a_0 = 0.397 nm, b_0 = 1.13 nm, c_0 = 0.561 nm, β = 135.0°, Z = 1 for $Nd_{2.1}Eu_{1.9}O_3F_6$ and a_0 = 0.404 nm, b_0 = 1.14 nm, c_0 = 0.574 nm, β = 135.3°, Z = 1 for $La_2Eu_2O_3F_6$). The ionic arrangement was suggested to be not a little disordered in the crystal lattice of $Nd_{2.1}Eu_{1.9}O_3F_6$ and $La_2Eu_2O_3F_6$ in contrast to that in the $Nd_2Eu_2O_3F_6$. The disorder of anionic arrangement in $Nd_{2.1}Eu_{1.9}O_3F_6$ and $La_2Eu_2O_3F_6$ lattice was assumed to result in the lower oxide ion conductivity $Nd_{2.1}Eu_{1.9}O_3F_6$ (σ = 1.0 S m^{-1}, τO^{2-} = 0.9) and $La_2Eu_2O_3F_6$ (σ = 0.8 S m^{-1}, τO^{2-} = 0.7).

On the way to prepare the binary rare earth oxide fluorides mentioned above, some glasses have been obtained. The obtained glass was a new oxide fluoride glass containing a large amount of rare earth element. Several reports have described preparation of glasses containing rare earth elements for use as optical or magneto-optical materials [5-8]. Every rare earth element has unique optical properties because of its arrangement of electrons in the 4f orbital. It is very interesting to study the preparation processes and characteristics of these glasses to develop new functional materials. Figure 2 shows fluorescence spectra of $20TbF_3$–$20BaF_2$–$10AlF_3$–$50GeO_2$/mol%+x/wt% SmF_3

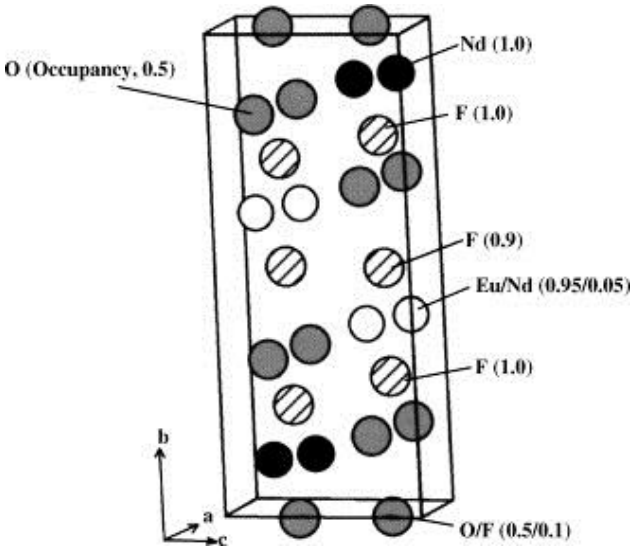

Fig.1 Unit lattice of $Nd_2Eu_2O_3F_6$.

Example

glasses (x=0.01–1.00). The intensity of fluorescence was measured about Sm-only doped glass and Tb–Sm co-doped glass where x=0.05. The intensities of fluorescence at 600 nm of Sm-only glass and Tb–Sm co-doped glass, were 6.7×10^{1} and 8.5×10^{3} cps, respectively. From the results, the emission originated from Sm^{3+} was enhanced by the presence of Tb^{3+} about 130 times.

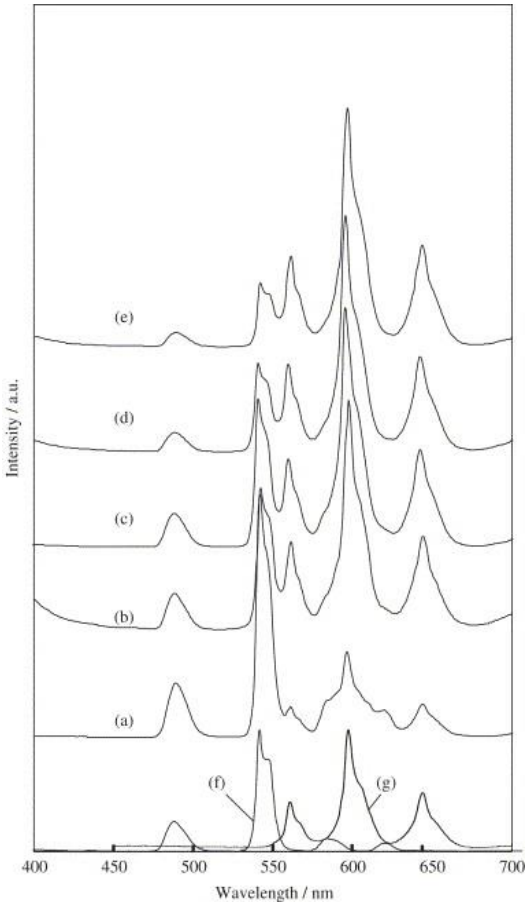

Fig.2 Fluorescence spectra of $20TbF_3$–$20BaF_2$–$10AlF_3$–$50GeO_2$/mol%+x/wt% SmF_3 glasses, (a) x=0.01, (b) x=0.08, (c) x=0.1, (d) x=0.5, (e) x=1.0. (f) and (g) respectively show the fluorescence spectra of $20TbF_3$–$20BaF_2$–$10AlF_3$–$50GeO_2$ and $20BaF_2$–$20AlF_3$–$60GeO_2$+0.05/wt% SmF_3 glasses.

References

[1] M. Takashima and G. Kano, *Solid State Ionics* **23** (1987), p. 99.
[2] M. Takashima, S. Yonezawa, K. Horita, K. Ohwaki and H. Takahashi, *J. Mater. Chem.* **6** (1996), p. 795.
[3] M. Takashima, S. Yonezawa and Y. Ukuma, *J. Fluorine Chem.* **87** (1998), p. 229.
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[5] S. Tanabe, *Rare Earths* **41** (2002), p. 1.
[6] T. Tamaoka, S. Tanabe, S. Ohara, H. Hayashi, N. Sugimoto, J. Alloys Compd, in press.