〈4-9〉

$BaPr_{0.8}Ln_{0.2}O_{3-\delta}$(Ln=$Yb^{3+}$, Dy^{3+}, Gd^{3+}, Sm^{3+}, Nd^{3+})계 perovskite 산화물의 생성상, 전기전도도 및 수송율

Phase Analysis, Electrical Conductivity and Transport Number of $BaPr_{0.8}Ln_{0.2}O_{3-\delta}$(Ln=$Yb^{3+}$, Dy^{3+}, Gd^{3+}, Sm^{3+}, Nd^{3+}) perovskite oxides

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$BaPrO_3$계 페롭스카이트 구조 산화물은 저온에서도 높은 전기전도도를 나타낸다고 보고되었다. 이 $BaPrO_3$계 산화물의 Pr^{4+}이온자리에 다양한 비율의 Yb^{3+}을 첨가한 경우의 전기전도도를 살펴본 결과, 20mol%의 Yb^{3+}을 첨가한 조성의 경우에 가장 높은 전기전도도를 나타내었으나 전도종에 대한 구체적인 분석은 이루어지지 않았다

따라서 이번 연구에서는 Pr^{4+}이온자리에 첨가한 양이온의 양을 20mol%로 고정시키고, 첨가제로서 Yb^{3+}이외에 이온반경이 더 큰 양이온(Dy^{3+}, Gd^{3+}, Sm^{3+}, Nd^{3+})들을 Pr^{4+}이온자리에 첨가하여 소결체의 생성상을 분석하였다. 또한 단일상이 얻어진 조성에 대한 전기전도도를 살펴보았으며 수송율 평가를 통해 전기전도도에 기여하는 전도종을 분석하였다.

〈4-10〉

Luminescence and Decay behaviors of Tb-doped Yttrium Silicate

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The photoluminescence (PL) of Terbium activated yttrium silicate with the general formula $Y_{2-x}Tb_x(SiO_4)O$ was investigated as a function of Tb^{3+} concentration. Especially, the main attention is focused on the $^5D_3$ fluorescence and its energy transfer behavior The emission and excitation spectra were measured in terms of Tb^{3+} concentration and analyzed. Diffuse reflectance spectra were also measured and analyzed in range from. VUV to UV As a result, yttrium silicate was found to have a broad excitation band extended from VUV to UV range and the concentration quenching was estimated both for $^5D_3$ and $^5D_4$ fluorescence The energy transfer was investigated by analyzing the decay curve of $^5D_3$ emission based on the multipolar interaction. The decay curves of $^5D_3$ emission, for which well known cross relaxation has been accepted as a main factor, were analyzed by Inokuti and Hirayama's formula based on the direct quenching scheme. Furthermore, the rate equations including a newly proposed quenching scheme, for which emission quenching is due to the two types of cross relaxation from $^5D_3$ or $^5D_4$ to ^7D and CTB in associated with inter-center migration, were taken into consideration.