LUMINESCENT CENTERS AND dc CONDCUTIVITY OF LaOCl AND LaOBr

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Among Lanthanum Oxyhalides, LaOBr is a typical PSL phosphor for radiographic imaging. The luminescent centers involving defects such as electron traps and hole traps contribute for the radiative processes. Thus, with a view to understand the luminescence mechanism in LaOCl and LaOBr, a systematic study of Thermally Stimulated Luminescence and dc conductivity has been under taken. The reason for studying TSL along with dc conductivity is being the defects like anion vacancies cause F-Centers as well as ionic conductivity. It is therefore both the techniques are employed to establish a correlation for identifying the luminescent centers.

Fig 1. Represents TSL glow curves Of LaOCl and LaOBr, being X-irradiated at room temperature. There is a shoulder along with a glow peak around 390 and 420K.While in LaOBr, a well defined peak is situated at 415k.Comparison of both the glow peaks indicate that the 420k glow peak may be due to radiative recombination of electrons being released from F centers with holes. The F centers might have been formed at anion vacancies due to chlorine or bromine as the case.

Fig.2 represents the dc conductivity of LaOCl, LaOBr and LaOBr: Tm. In both the materials, there exist extrinsic and intrinsic regions of conductivity representing the contributions of impurities and freshly generated defects. The high temperature conductivity is because of anion vacancies whose concentration is high in the case of LaOCl. These results are explained on the basis of structural considerations and defect probabilities by taking activation energies in both cases. As LaOCl and LaOBr have same structure as BaFCl, the anion vacancies due to Cl or Br ions may be responsible for conductivity and thermally stimulated luminescence. The reasons for this conclusion are being explained.

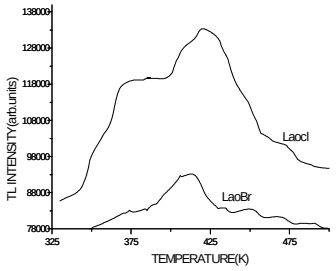
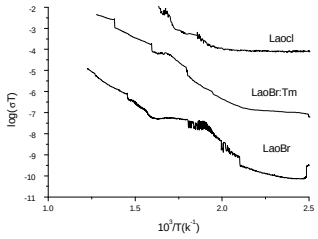


Fig 1. TSL GLOW CURVES OF LaOCl and LaOBr

Fig 2. DC CONDUCTIVITY



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