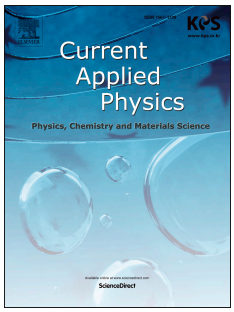
Accepted Manuscript



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PII: S1567-1739(18)30138-X

DOI: 10.1016/j.cap.2018.05.014

Reference: CAP 4755

To appear in: *Current Applied Physics*

Received Date: 15 April 2018

Accepted Date: 11 May 2018

Please cite this article as: J.H. Oh, J.H. Kim, J.H. Jeong, S.H. Chang, Resonant inelastic X-ray scattering of tantalum double perovskite structures, *Current Applied Physics* (2018), doi: 10.1016/j.cap.2018.05.014.

Resonant Inelastic X-ray Scattering of Tantalum Double Perovskite Structures

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In this paper, we investigated the electronic structures and defect states of $SrLaMgTaO_6$ (SLMTO) double perovskite structures by using resonant inelastic x-ray scattering. Recently, Eu^{3+} doped SLMTO red phosphors have been vigorously investigated due to their higher red emission efficiency compared to commercial white light emitting diodes (W-LED). However, a comprehensive understanding on the electronic structures and defect states of host SLMTO compounds, which are specifically related to the W-LED and photoluminescence (PL), is far from complete. Here, we found that the PL spectra of SLMTO powder compounds sintered at a higher temperature, 1400^{o}C, were weaker in the blue emission regions (at around 400 nm) and became enhanced in near infrared (NIR) regions compared to those sintered at 1200^{o}C. To elucidate the difference of the PL spectra, we performed resonant inelastic x-ray spectroscopy (RIXS) at Ta L-edge. Our RIXS result implies that the microscopic origin of different PL spectra is not relevant to the Ta-related defects and oxygen vacancies.

Keywords: Resonant Inelastic X-ray Scattering, $SrLaMgTaO_6$, Double Perovskites, Light Emitting Diodes