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Depth resolved x-ray excited optical luminescence from SrTiO₃¹ R.A. ROSENBERG, Argonne National Lab, K. VIJAYALAKSHMI, M. KAREEV, J. LIU, B. GRAY, J. TCHAKHALIAN, C. BROOKS, D.G. SCHLOM, J. ZHANG, L.J. BRILLSON — $SrTiO_3$ and related perovskite materials are increasingly being utilized in a wide range of electrical applications. Furthermore, $SrTiO_3$ is often used as a substrate for growth of thin film structures. Thus, knowledge of its defect structure and, in particular, their depth dependence is crucial for understanding their impact on conductivity and optical phenomena. In the present work we have utilized the limited penetration depth of x-rays to study the near-surface properties of $SrTiO_3$ substrates and epilayers For an energy of 600 eV the penetration depth varies between 5 and 144 nm as the incidence angle changes from 2 to 32 degrees. Thus, by obtaining optical luminescence spectra as a function of incidence angle it is possible to probe the near-surface region with nm-scale resolution. We will present angle dependent optical luminescence data from several $SrTiO_3$ samples and discuss the results in terms of previous cathodoluminescence studies [1] and theoretical models. [1] J. Zhang, et al, J. Vac. Sci. Technol. B 26, 1456 (2008).

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