

Abstract Submitted  
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**Cathodoluminescent Study of  $\text{Li}_2\text{B}_4\text{O}_7$  Doped with Cu, Mn, and Ag** ZACHARY HADFIELD, ROBERT HENGEHOLD, JOSHUA REDING, Air Force Institute of Technology, DAVID TURNER, Oak Ridge Institute of Science and Education — Lithium tetraborate or LTB crystals are being developed for possible use in solid state neutron detectors. LTB is of interest due to its large cross section for neutron capture by lithium and boron. Furthermore, the crystal fluoresces in the presence of ionizing radiation, making it an attractive candidate for a scintillating detection device. However, there is a lack of fundamental knowledge about the material characteristics, particularly with regard to its fluorescent spectrum. Cathodoluminescence (CL) measurements were conducted on undoped and doped samples of lithium tetraborate in order to characterize the nature of its fluorescent spectra under different conditions. Measurements were made using a vacuum ultraviolet CL system specifically designed to detect high energy photons emitted in wide band gap materials. The CL spectra from 10 K to room temperature were characterized for six different lithium tetraborate crystals: three undoped crystals and one each doped with silver, copper, and manganese. In addition, thermoluminescence measurements were conducted using a Harshaw Model 3500 Manual TLD Reader. After electron irradiation from the cathodoluminescence experiment, the samples were heated from 50°C to 250°C at a heating rate of 1°C per second. The thermoluminescence measurements provided insight into the carrier trapping ability of the crystals after electron irradiation.

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