

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Crystal growth and characterization of  ${}^6\text{LiInSe}_2$  neutron detector**<sup>1</sup> YUNLONG CUI, PIJUSH BHATTACHARYA, MICHAEL GROZA, EUGENE TUPITYSN, EMMANUEL ROWE, VLADIMIR BULIGA, LIVIU MATEI, BRENDEN WIGGINS, Fisk Univ, DANIEL JOHNSTONE, SEMETROL, ASHLEY STOWE, Y-12 National Security Complex, ARNOLD BURGER, Fisk Univ —  ${}^6\text{LiInSe}_2$  is a promising thermal neutron semiconductor detector material. The performance of the detector is affected by the carrier mobility-lifetime product. Therefore, defects that function as carrier recombination center need to be identified. In the presentation, the crystals were grown from melt by the vertical Bridgman method, and characterized by photo-induced current transient spectroscopy (PICTS), low-temperature photoluminescence (LTPL) and detector performance measurement. PICTS measurements revealed electron-related defects located at 0.22, 0.36 and 0.55 eV and hole-related defects at 0.19, 0.30, and 0.73 eV. The defect values are consistent with those measured from LTPL donor-acceptor pair emissions. The carrier mobility-lifetime products were extracted from DC photocurrent and alpha-particle response measurements.

<sup>1</sup>This work was partial supported by the Y-12 National Security Complex Plant Directed Research and Development Program No. 630001269, DOE Grant No. 1089091, and the Army Grant No. W911NF-11-0196.

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Date submitted: 07 Jan 2014

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