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Mobility Determination of Amorphous Hydrogenated Boron Carbide from Dark-Injection Space-Charge-Limited Current Method CHRISTOPHER KECK, BRADLEY NORDELL, THUONG NGUYEN, JUSTIN HURLEY, ANTHONY CARUSO, MICHELLE PAQUETTE, Univ of Missouri - Kansas City — There has been particular interest in thin-film amorphous hydrogenated boron carbide (a-BxC:Hy) for solid-state direct-conversion neutron detection because it has a high cross-section for neutron capture and demonstrates a high electrical resistivity (on the order of 10^{12} $\Omega\cdot$ cm). Rigorous studies into the electrical transport properties of the material are yet to be done. The experimental determination of the material's mobility is complicated by the fact that it is likely below the noise floor of conventional measurements such as the DC Hall Effect method, wherein the measured Hall Voltage is directly proportional to the mobility. One way to circumvent this problem is to utilize a drift mobility measurement technique such as the dark-injection space-charge-limited current (DI-SCLC) method, where the mobility is calculated using the transit time of the charge carrier; as transit time and mobility are inversely proportional, this method is ideal for low mobility materials. The implementation of the DI-SCLC method for mobility measurements in a-BxC:Hy will be described, and the relationship of mobility, resistivity, and carrier concentration as a function of thin-film growth conditions will be discussed.

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