

Abstract Submitted  
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**PbSe Quantum Dot Growth using MBE** DUSTIN KLEIN, NATHANIEL BECKER, TIM KIDD, Univ of Northern Iowa — We have studied the formation of PbSe quantum dots by molecular beam epitaxy (MBE). It has been shown that PbSe can generate multiple carriers from a single photon, making it attractive for solar cell research. These quantum dots were grown onto silicon substrates that were either clean or coated with buffer layers of CaF and/or BaF. The size and distribution shapes are controlled by temperature and growth rates. The purity and stoichiometry of the sample are determined using Auger spectroscopy upon creation. We used a scanning electron microscope and atomic force microscope (AFM) to verify the size and nature of the quantum dots after they are created. Preliminary investigations indicate the buffer layers were susceptible to Fluorine deficiency in vacuum and also aged quickly in air when not capped with PbSe. Our results on thicker films of PbSe, in which thin films rather than dots are created, are smooth and uniform but do include many features with sizes on the order of 10 – 100 nm. Thinner coatings of PbSe are highly dependent on the quality and nature of the buffer layer they are grown upon.

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