Nanoengineered materials for SWIR HOT detectors

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Abstract
Heavy metal Selenide has been investigated for more than half century for high operating temperature (HOT) mid wave infrared (MWIR) applications. Most of the efforts have been devoted to to make detector arrays on high-resistivity Si substrates for operating wavelengths in the 1.5 to 5.0 μm region using physical vapor transport grown poly crystalline materials. For most of the biological spectral and imaging applications, short wave infrared (SWIR) detectors have shown better performance. Recent growth materials have shown variation in morphology with slight change in growth conditions and hence variation in performance parameters such as bandgap, mobility and resistivity from sample to sample. We have performed growth and optical characterization of pure and doped PbS and PbSe and have determined bandgap using available theoretical models for different morphologies.

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