

Size dependent properties of amorphous InP quantum dots

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Quantum confinement in amorphous phase is rarely reported. We systematically explored the quantum confinement in the amorphous phase of InP. Size dependent optical gap of well characterized InP a-QD (amorphous quantum dots) is reported in this work. Amorphous nature of the grown QDs was confirmed by selected area electron diffraction (SAED) images. The growth of dot size with growth duration was found to follow a linear trend. The short range order of InP differs slightly in crystalline and amorphous phases as evident by the structural analysis reported in literature. This was also confirmed by Raman analysis of our samples. Calculated value of E_g (bulk) and μ was found to be different than the values reported in literature. This confirms a different short range order in the two phases. The magnitude of blue shift in energy gap of the amorphous dots is smaller than that of crystalline dots for InP consistent with the significant difference in E_g of the two phases. This study shows that the nature of quantum confinement in InP dots is almost same in amorphous and crystalline phases, although different in magnitudes.

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