

Raman analysis of CdTe nanoparticles embedded in a SnO₂

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Abstract

Cadmium telluride nanoparticles were grown in a SnO₂ matrix by means of the r.f. sputtering technique. X-ray patterns reveal that the CdTe quantum dots (QD) grow in the hexagonal wurtzite (W) phase. The broad bands of the X-ray patterns and the Scherrer formula allowed, by assuming a spherical shape, the QD size calculation, which have average diameters in the range 2.9 – 8.5 nm. The Raman spectra show the A₁(LO) at ~ 120 cm⁻¹ and E(TO) at ~ 139 cm⁻¹ modes corresponding to Te, and the TO at ~ 141 cm⁻¹ and LO at ~ 167 cm⁻¹ modes of CdTe in the cubic phase at the Γ point of the first Brillouin zone. This fact could be due to a similar case of hexagonal and cubic CdS, where some Raman modes have very close values. The LO of W-CdTe band follows the expected behavior as for phonons in nanoparticles.