

Abstract Submitted
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Quantum confinement effects in nanocrystals of SnO₂ in MgO matrix M.B. SAHANA, Wayne State University, C. SUDAKAR, Indian Institute of Technology Madras, India, A. DIXIT, J.S. THAKUR, R. NAIK, Wayne State University, V.M. NAIK, University of Michigan-Dearborn — We have studied the nanocrystal formations of SnO₂in. x SnO₂-(1- x)MgO composite thin films (x =0 to 1 and thickness 0.5 to 1 μ m) prepared by metal-organic decomposition method. We find a direct relationship between the size of SnO₂ nanocrystals and the annealing temperature. Similarly, higher concentration of Mg in x SnO₂-(1- x)MgO leads to smaller size nanocrystals of SnO₂. Under the controlled choice of composition and annealing conditions, the bandgap of SnO₂ can be continuously increased from 3.89 eV to 4.5 eV thus providing a generic approach for tuning the bandgap in nanocomposite systems over a wide range of energy. We discuss this behavior in terms of the quantum confinement effect arising from particle size being comparable to the order of Bohr radius of the material.

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