

## Non-catalytic growth of ZnO microspheres and cages: structural and optical properties

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Micro-sized ZnO hollow spheres and cages have been prepared in high density on Si(100) and steel alloy substrates, without any catalyst or additives, using the thermal evaporation of metallic Zn powder and oxygen gas at the temperature ranges between 300–600°C. The morphological studies revealed that the average sizes of the deposited materials ranges from 1–5 μm. Study on detailed structural properties and crystallinity by TEM equipped with SEAD pattern and XRD, respectively exhibited the wurtzite hexagonal with single crystalline grown along the [0001] direction for the synthesized structures. Optical properties of these structures were measured at room temp. by Raman spectroscopy and PL measurements. Raman spectra showed a characteristic ZnO wurtzite hexagonal peak at 436.9 cm<sup>-1</sup> and 437 cm<sup>-1</sup> for the products obtained on the Si(100) and steel alloy substrates, respectively. The room temp. PL spectra in both the cases showed a broad band in the visible region with suppressed and short UV emission and indicating that these structures having the more structural defects such as O-vacancies and Zn interstitials etc.