

Part 11

Syntheses of PVP embedded ZnO quantum dots and the investigation of their methanol sensing properties

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Abstract

We prepared ZnO quantum dots embedded in polyvinylpyrrolidone (PVP) matrix and reported their working as methanol sensor. The samples were prepared via quenching technique where bulk ZnO powder was calcined at very high temperature of 1100⁰C and then quenched in ice cold polyvinylpyrrolidone solution.

The specimens were characterized by using X-ray diffraction study, UV/VIS spectroscopy, high resolution transmission electron microscopy and scanning electron microscopy. These studies indicated the sizes of quantum dots to be within 10 nm. The quantum dots were examined for methanol vapor sensing by exploring the variation of quantum dot resistance with time at different operating temperatures. It was revealed that ZnO quantum dots can sense methanol at low operating (200⁰ C) temperature with very less response time.

Keywords: Quantum dot, sensor, methanol.

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