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## Growth and characterization studies of oxide nanowires: Tin oxide, zinc oxide and indium oxide

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Oxide nanowires of three different material systems are discussed in this work. These are tin oxide, zinc oxide and indium oxide wires. All were grown by vapor-liquid-solid (VLS) method. Optical emissions from the grown SnO<sub>2</sub> nanowires allowed estimations of the donor and acceptor binding energies. The shift in the UV and the intensity of the visible luminescence was found to be dependent on the surface states as well as the diameters of the tin oxide nanowires. The effects of annealing and growth conditions were investigated. The modification of the SnO<sub>2</sub> nanowire electronic and surface properties at room temperature on being exposed to gamma-radiation was explored. The luminescence and transmission data from the irradiated nanowires indicate a change in the nature and density of surface defects after exposure to highly energetic radiation allowing for use in sensors. In the zinc oxide nanowires, the effects of different metal coatings were explored. The effect of the Ar plasma during metal deposition on the photo luminescence of metal-coated ZnO nanowires was investigated. Strong enhancement of near-band-edge emission was observed for ZnO nanowires coated with Al and Ni nanoparticles by radiofrequency magnetron sputtering, while the samples coated by e-beam evaporation showed quenching of the PL intensity. The electrostatic potential and depletion width in piezo electric semiconductor nanowires were also derived by considering a non-depleted region and a surface depleted region and solving the Poisson equation. Growth and characterization of In<sub>2</sub>O<sub>3</sub> will be also presented.

### Biography

Mitra Dutta is Vice Chancellor for Research and a Distinguished Professor of ECE at the University of Illinois at Chicago. She served as Head of the ECE at UIC for nearly eleven years. She has authored or co-authored over 570 publications and presentations, holds 30 US and Canadian patents, has co-edited six books and is a co-author of three. She is a Fellow IEEE, Fellow AAAS, Fellow APS, Fellow OSA and Fellow of the Society of Women Engineers (SWE). She received the IEEE Harry Diamond Award in 2000 and the National Achievement Award from the SWE in 2003.

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