J Material Sci Eng 2012, 1:3
http://dx.doi.org/10.4172/2169-0022.S1.008

OMICS Group Conferences
Accelerating Scientific Discovery
International Conference and Expo on
Materials Science & Engineering
October 22-24, 2012 DoubleTree by Hilton Chicago-North Shore, USA

Zinc Oxide (Undoped, Aluminium doped & Lithium doped) nanowires - Structural & optical properties

P.S. Gupta and Nandashakti
Indian School of Mines, India

Zinc Oxide (ZnO) is a wide bandgap (E_g = 3.37 eV) semiconductor having large exciton binding energy of 60 meV at room temperature. In the recent years ZnO has attracted much attention due to its potential applications in optoelectronic devices such as Ultra violet lasers and light-emitting diodes. One-dimensional (1-D) ZnO nanowires/rods have been widely studied for its technological applications. ZnO nanowire UV sensor. And nano power generators have been developed using ZnO nanowires. The methods for synthesizing ZnO nanowires are Chemical Vapour Deposition (CVD) , metal organic CVD , thermal evaporation , the template method , electrochemical deposition and the hydrothermal method . However, these methods involve strictly controlled synthesis environment, complicated procedures and expensive instruments. In this study we have used simple , cost effective and rapid synthesis method for fabricating ZnO nanowires via thermal decomposition of Zinc acetate dihydrate in air at 300°C .Lithium hydroxide and Aluminium isopropoxide were used as precursors for synthesizing Li and Al doped ZnO nanowires respectively. The structural property of doped and undoped ZnO nanowires was studied by X-ray diffraction (XRD). The samples showed polycrystalline nature. Scanning electron microscopy (SEM) and Transmission electron microscopy (TEM) was used to identify the nanostructured morphology of the samples. The optical property of the grown nanowires was studied by Photoluminescence (PL) of the samples, which showed Ultra violet (UV) emission. The strong emission of undoped, Al and Li doped ZnO nanowire makes it potential candidate for the fabrication of UV lasers and related optoelectronic devices.

Biography

Partha Sarathi Gupta has completed his Ph.D degree from I.I.T., Kharagpur in the year 1982. He has published more than 75 research papers in reputed journals and acted as referee and also as member of editorial boards. His present field of research interest is Nano Science and Quantum Optics. Presently he is Dean and Professor in Applied Physics at Indian School of Mines, Dhanbad, India.

psgupta2ism@yahoo.co.in

Squeezing of radiation in coherent anti-stokes Hyper-Raman Scattering process

Partha Sarathi Gupta
Indian School of Mines, India

Squeezing of the electromagnetic field , which is a purely quantum mechanical phenomenon has attracted considerable attention owing to its low-noise property with applications in high quality telecommunication. This quantum effect is expected to manifest itself in optical processes in which the nonlinear response of the system to the radiation field plays an important role. Squeezing has been either experimentally observed or theoretically predicted in a variety of nonlinear optical processes such as harmonic generation , multi-wave mixing processes , Raman , hyper-Raman etc. Later the notion of amplitude squeezing of quantized electromagnetic field have been introduced in various nonlinear optical processes. The effect of squeezing of radiation in coherent anti-stokes hyper Raman scattering (CAHRS) is investigated under the short-time scale based on a fully quantum mechanical approach. In an idealized model CAHRS, the interaction is looked upon as a process involving absorption of two pump photons and emission of stokes photon, which is followed by absorption of two more pump photons and subsequent emission of an anti-Stokes photon at different frequency. The coupled Heisenberg equations of motion involving real and imaginary parts of the quadrature operators are established and solved under short-time scale. The occurrence of amplitude squeezing effects in both the quadrature of the radiation field in the fundamental mode is investigated using required conditions of squeezing. The results obtained may pave way to obtain desired degree of squeezing through different higher-order nonlinear optical processes.

Biography

Partha Sarathi Gupta has completed his Ph.D degree from I.I.T., Kharagpur in the year 1982. He has published more than 75 research papers in reputed journals and acted as referee and also as member of editorial boards. His present field of research interest is Quantum Optics and Nano Science. Presently he is Dean and Professor in Applied Physics at Indian School of Mines, Dhanbad, India.

psgupta2ism@yahoo.co.in