

PULSED LASER DEPOSITION GROWN ZnO NANORODS

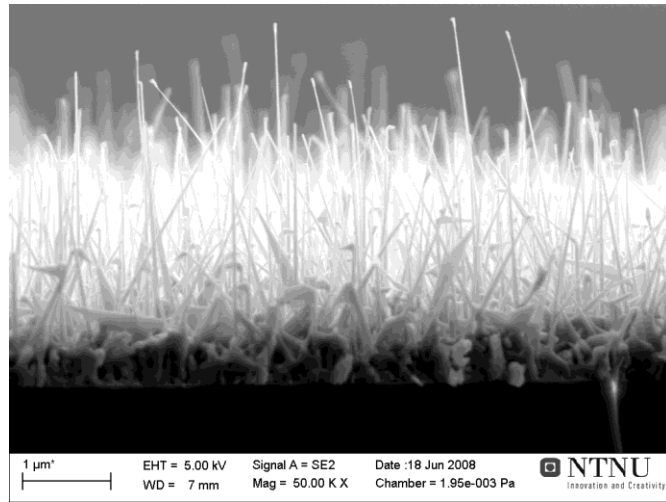
M. Bergren¹, C. Weigand², D. Carey¹, K. Valsset², C. Ladam², H. Weman², R. Collins¹, T. Furtak¹

¹Physics Department, Colorado School of Mines
Golden, CO 80401

²Norwegian University of Science and Technology/SINTEF
Trondheim, Norway

Recent studies in achieving low-cost photovoltaic devices with high efficiencies have shown hybrid organic/inorganic devices as potential candidates. By creating ordered nanostructures of the inorganic acceptor (e.g. ZnO), charge carriers can be directed to the correct electrodes and the interface area can be increased. Understanding and controlling the morphology of the inorganic nanostructures is essential in achieving higher charge transfer and therefore higher efficiencies of hybrid organic/inorganic devices.

Using Pulsed Laser Deposition (PLD), arrays of ZnO nanorods can be grown by ablating a ZnO target by a KrF excimer laser onto silicon (001) and sapphire (0001) substrates. A gold catalyst was used in this research to assist in ZnO nanorod growth. Effects of temperature, pressure and type of background gas on nanorod growth have been studied. Nanorods were grown at temperatures ranging from 500°C-700°C and pressures ranging from 0.05mbar to 0.5mbar. As temperature was increased, higher densities and quantities of nanorods were achieved. Raising the pressure followed the same trends. Increasing oxygen/argon ratio in the background gas led to larger nucleation sites and therefore larger rods whereas homogeneity decreased. Highly oriented rods have been attained after a ZnO buffer layer had been introduced.



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