

Abstract Submitted
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The influence of Atomic Oxygen on the Figure of Merit of Indium Tin Oxide thin Films grown by reactive Dual Ion Beam Sputtering¹ WILHELMUS GEERTS, NELSON SIMPSON, ALLEN WOODALL, MACLYN COMPTON, Texas State University, San Marcos, TX 78666 — Indium Tin Oxide (ITO) is a transparent conducting oxide that is used in flat panel displays and optoelectronics. Highly conductive and transparent ITO films are normally produced by heating the substrate to 300 Celsius during deposition excluding plastics to be used as a substrate material. We investigated whether high quality ITO films can be sputtered at room temperature using atomic instead of molecular oxygen. The films were deposited by dual ion beam sputtering (DIBS). During deposition the substrate was exposed to a molecular or an atomic oxygen flux. Microscope glass slides and silicon wafers were used as substrates. A 29 nm thick SiO₂ buffer layer was used. Optical properties were measured with a M2000 Woollam variable angle spectroscopic ellipsometer. Electrical properties were measured by linear four point probe using a Jandel 4pp setup employing silicon carbide electrodes, high input resistance, and Keithley low bias current buffer amplifiers. The figure of merit (FOM), i.e. the ratio of the conductivity and the average optical absorption coefficient (400-800 nm), was calculated from the optical and electric properties and appeared to be 1.2 to 5 times higher for the samples sputtered with atomic oxygen. The largest value obtained for the FOM was 0.08 reciprocal Ohms.

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