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Effect of Ion beam Potential on Structural and Electrical Properties of In_2O_3 film in Reactive Ion-Assisted Deposition (R-IAD)

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Indium oxide thin films were deposited on glass substrate by using reactive ion-assisted deposition methode. Neutral indium atom was evaporated with assisting ionized oxygen in high vacuum chamber at a pressure of 8×10^{-5} torr and deposition temperature was varied from room temperature to 200 ℃. Oxygen gas was ionized and accelerated by cold hallow-cathode type ion gun at oxygen flow rate of 2 sccm (*ml*/min.). Ion beam potential of oxygen ions was changed from 0 to 700 V at fixed current density. From XRD analysis, it is found that the relative peak ratio of (222)/(400) and (222)/(440) increases with increasing ion beam potential. Surface roughness of indium oxide films was changed from 25 Å to 100 Å depending on ion beam potential. Sheet resistance of indium oxide films was measured by four-point probe and varied from 38 to 380 ohms/square. Relation between structural and electrical properties will be discussed with ion beam potential of oxygen ions.