

Effects of Barrier Layer on the Electrical Property of Spin Coated Sn – Sb Oxide Films on Glass

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Abstract

Antimony doped tin oxide films of two different compositions (10 and 30 atom % of Sb) were deposited on various glass substrates by sol-gel spinning technique. Three types of glass substrates, namely, bare soda lime silica (SLS) glass, barrier silica layer coated soda lime glass and pure silica glass were chosen. Phase identification and measurements of electrical properties of the deposited films were carried out. Along with normal cassiterite SnO_2 phase, presence of monoclinic Na_3SbO_4 could also be identified in case of films deposited on bare SLS glass substrate clearly indicating the migration of Na^+ ion from substrate to the film during annealing treatment. Absence of Na_3SbO_4 phase in the films deposited on silica coated SLS glass substrate implies the effectiveness of the barrier silica layer in preventing the Na^+ ion migration into the film. This is also supported by the fact that the films deposited on barrier layer coated substrate exhibit superior conductance property than those deposited on the substrate without having any barrier layer. This is because, presence of the acceptor Na^+ ion in the film decreases the carrier concentration of the latter.

Keywords: ATO Film, Electrical Properties, Spin Coating, Sol-Gel