

A Comparative Study on the Effect of Substrates on Electrical Properties of Tin and Chromium Thin Films

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Substrate is the foundation on which the thin film components are built. The substrate properties have significant influence [1] on the performance of the device [2]. The surface morphology and the quality of the films depend on the type of substrates [3]. Alumina and soda glass are still the most common substrate materials due to their surface quality, cost and high frequency performance. Specific applications require different substrate materials that offer an acceptable compromise for the purpose at hand. Therefore, we have selected soda glass and quartz as substrates to grow thin films of tin and chromium by thermal evaporation in vacuum. Resistance of the films were measured by the standard four probe technique, in situ, as a function of thickness. Experimental data were analyzed in the light of Fuchs- Sondheimer [4] and Mayadas-Shatzkes [5] theories. Resistivity-thickness data yield information on many physical parameters such as infinitely thick film resistivity, conduction electron mean free path, sticking coefficient etc.

Keywords: Soda glass, quartz substrates, infinitely thick film resistivity, conduction electron mean free path and binding energy.

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