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Preparation and Optimization of High Quality TiN Films

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**Abstract:** TiN thin films have been deposited by DC reactive magnetron sputtering method on glass substrates. The effects of the substrate temperature and the substrate bias voltage on the structural, optical and electrical properties of the films were studied by using XRD, STM, optical transmission and resistivity measurements. The bias voltage was varied in the 0 to 200 V range for two substrate temperatures, 100 °C and 300 °C. The results showed that the substrate bias voltage influenced the stoichiometry and structure of the films. The smoothest and least porous TiN films were prepared at about 160 V substrate bias voltage and 300 °C substrate temperature. The electrical resistivity of the TiN films decreased with increasing substrate temperature and increasing thickness. It is found that the optical transmission of the films in the visible region were enhanced by increasing the substrate bias voltage for the same substrate temperature. In addition, optical transmission was improved by the TiN/MgF<sub>2</sub> two layer AR coating.

**Key Words:** TiN, Magnetron Sputtering, Ion Bombardment, Optical transmission, Antireflection coating.

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