

Abstract Submitted  
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**Modifications in Structural, Electrical, Electronic and Mechanical Properties of Titanium Thin Films under different Gas Plasmas<sup>1</sup>**  
OMVEER SINGH, RAJ P. DAHIYA, HITENDRA K. MALIK, Indian Inst of Tech-  
New Delhi — In the recent past, Titanium thin films can be grown over different substrates such as silicon, glass and quartz by using versatile deposition techniques DC, RF sputtering, electronic beam and thermal evaporation etc. The grown films are then exposed in different gas environments for individual application. It has been found that Titanium nitride exhibits good chemical stability, mechanical and electrical properties. To investigate these properties in titanium nitride thin films, we have developed a new approach hot cathode arc discharge plasma system. By using this technique, we can measure plasma and nitriding parameters independently. In the present work, we have investigated gases mixture (Nitrogen, Argon and Hydrogen) effect on the structural, mechanical, electrical and electronic properties in plasma system. We have used 100% N<sub>2</sub>, 50% N<sub>2</sub> + 50% Ar and 50% N<sub>2</sub> + 50% H<sub>2</sub> gases ratio for plasma nitriding. Structural and electronic structure properties are measured from X-ray diffractions (XRD) and X-ray photoelectron spectroscopy (XPS) respectively. The surface morphology of these films were measured using Atomic Force Microscopy (AFM) and the nano-indentation mode is used to find out the hardness of the samples.

<sup>1</sup>Government of India

Omveer Singh  
Indian Inst of Tech-New Delhi

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