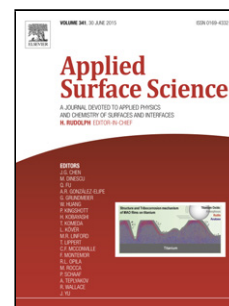


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Author: Violeta Merie Marius Pustan Gavril Negrea Corina
Bîrleanu



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Title: Research on titanium nitride thin films deposited by reactive magnetron sputtering for MEMS applications

Authors name and affiliation: Violeta Merie ^{a,*}, Marius Pustan ^a, Gavril Negrea ^b, Corina Bîrleanu^a

^a Technical University of Cluj-Napoca, Mechanical Systems Engineering Department, 103-105 Muncii Avenue, 400641, Cluj-Napoca, Romania

^b Technical University of Cluj-Napoca, Materials Science and Engineering Department, 103-105 Muncii Avenue, 400641, Cluj-Napoca, Romania

Corresponding author: Violeta Merie: e-mail: Violeta.Merie@stm.utcluj.ro; address: 103-105 Muncii Avenue, 400641, Cluj-Napoca, Romania; phone number: 0040.745.047.843

Abstract: Titanium nitride can be used among other materials as diffusion barrier for MEMS (microelectromechanical systems) applications. The aim of this study is to elaborate and to characterize at nanoscale titanium nitride thin films. The thin films were deposited by reactive magnetron sputtering on silicon substrates using a 99.99 % purity titanium target. Different deposition parameters were employed. The deposition temperature, deposition time, substrate bias voltage and the presence/absence of a titanium buffer layer are the parameters that were modified. The so-obtained films were then investigated by atomic force microscopy. A significant impact of the deposition parameters on the determined mechanical and tribological characteristics was highlighted. The results showed that the titanium nitride thin films deposited for 20 minutes at room temperature without the presence of a titanium buffer layer when a negative bias of -90 V was applied to the substrate is characterized by the best tribological and mechanical behavior.

Keywords: titanium nitride thin films, reactive magnetron sputtering, adhesion, mechanical and tribological characterization, MEMS

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