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Study on the composition and structural properties of Ti-C(O,N) thin filmsCacilda Moura¹, Luis Cunha¹, Jean-Marie Chappé², Filipe Vaz²¹Dept de Física - Universidade do Minho, Braga, Portugal ²Dept. Física - Universidade do Minho, Guimarães, Portugal

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Ti-C(O,N) thin films were deposited by reactive magnetron sputtering, from a pure titanium target, using acetylene and an oxygen and nitrogen mixture as reactive gases. A set of samples was produced on silicon substrates tuning the (O₂ + N₂) flow rate from 0 to 4 sccm, while the acetylene flow rate was kept constant at 5 sccm. This variation provoked obvious changes in composition and structure exhibiting extended behaviors from oxycarbide to titanium carbide compounds. X-ray diffraction experiments revealed a face centered cubic structure for all the films but with a significant reduction of the lattice parameter. The structural analysis showed that the titanium carbide structure produced without O₂ + N₂ injection led to a progressive substitution of carbon by oxygen and/or nitrogen atoms in the lattice. In order to further study the effect of deposition conditions on the properties of the films, Raman spectroscopy was used. The changes induced in film's properties and their correlation with both composition variations and structural modifications will be discussed.

Keywords

Ti-C(O,N) thin films

Raman spectroscopy

composition

reactive magnetron sputtering