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The effect of substrate temperature on the structure and morphology of titanium nitride compounds grown by DC magnetron sputtering MOHAMMAD R. HANTEHZADEH, REZA BAVADI, Plasma Physics Research Center, Science and Research branch, Islamic Azad University — The TiN thin films were deposited on p-type silicon (100) substrates using reactive planar DC magnetron sputtering system. The target was 99.99% pure Ti. The reactive sputter gas was a mixture of Ar (99.999%) and N₂ (99.999%) with the ratio Ar (97%) and N₂(3%) by volume. Structural characterization of the coating was done using X-ray diffraction (XRD). The surface roughness of the coating was determined using an Atomic Force Microscope (AFM). The reflectivity of thin films was investigated by a spectrophotometer system. The X-ray diffraction measurements showed that by increasing the substrate temperature during the growth, change in crystalline structure will occur. The crystallite size of the films determined by Scherer's equation, and the crystallite size measured by AFM also increased by increasing the substrate growth temperature. The surface reflectivity measurements indicate that by increasing the substrate growth temperature, the optical properties of the films changes. The change in optical properties and crystalline structure of the films indicate that substrate growth temperature plays an important role in structure and morphology of the grown layers.

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