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## Enhancement of rutile phase formation in TiO<sub>2</sub> films deposited on stainless steel substrates with a vacuum arc

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### Abstract

The rutile phase of TiO<sub>2</sub> has raised a wide interest for biomaterial applications. Since rutile is generally synthesized at high temperatures, a deposition process based on a cathodic arc discharge has been investigated in order to obtain rutile coatings at lower temperature on stainless steel substrates. In this work, TiO<sub>2</sub> films were deposited on AISI 316L stainless steel substrates heated at 300 and 400 °C with a negative bias of 120 V, employing Ti interlayers of different thicknesses. TiO<sub>2</sub> films of approximately 500 and 900 nm were grown on Ti interlayers with thicknesses in the range 0 - 550 nm. The effect of Ti interlayers on the crystalline structure of TiO<sub>2</sub> coatings was systematically studied with X-ray diffraction and Raman spectroscopy. The introduction of the Ti layer increased the rutile/anatase proportion either at 300 or 400 °C, turning rutile into the main phase in the TiO<sub>2</sub> film. The largest amount of rutile for both temperatures was attained with a 55 nm Ti interlayer, the thinnest thickness studied.

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