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THE ROLE OF TEMPERATURE IN THE SUPERFICIAL PROPERTIES OF THERMALLY OXIDIZED Ti-15Zr-Mo ALLOYS FOR POTENTIAL USE AS BIOMATERIALS

Correa, D.(1); Grandini, C.(2); Sottovia, L.(2); Cruz, N.(2); Rocha, L.(2);
(1) IFSP; (2) UNESP;

Thermal oxidation is a low-cost and versatile method, which tends to induce a biocompatible TiO2 oxide layer on Ti surfaces. This study aims to analyze the role of temperature in the oxide layer growth in Ti-15Zr-xMo (0, 5, 10 and 15 wt%) alloys. The ingots were produced by argon arc-melting. Thermal oxidation treatments were carried out between 500 and 900 ºC, for 6 hours, in air. The phase composition, morphology and chemical distribution were analyzed by XRD, SEM, EDS, and XPS. Roughness values were calculated by confocal microscopy. Vickers microhardness values were obtained at 0.200 kgf for 60 s. The morphology showed nucleation sites of oxides. Oxide layers were composed preferentially by TiO2 (rutile phase), with a little amount of ZrO2. Thickness, roughness, and microhardness values were dependent on the temperature applied. The results indicated the thermal oxidation process produced interesting superficial properties for use as biomaterials. (Financial support: CNPq and Fapesp)