

Metallographic Study and Corrosive Behavior of Titanium Alloys for their Use in Medical Applications

Héctor GUERRA YÁNEZ^{1*},
Néstor Rubén FLORIDO SUÁREZ¹, Ionelia
VOICULESCU², Julia Claudia MIRZA ROSCA¹

¹ Mechanical Engineering Department, University of Las Palmas de Gran Canaria, Campus Universitario de Tafira, 35017 Las Palmas de Gran Canaria, Spain

¹ Faculty of Industrial Engineering and Robotics, Politehnica University of Bucharest, 313 Splaiul Independentei, 060042 Bucharest, Romania

hector.guerra99@gmail.com

Abstract. The study aims to characterize two alloys in order to evaluate if they can be used for medical applications, these alloys have the following compositions: A1 (93.2% Ti, 4% Fe, 2% Al, 0.8% V) and A2 (96,5% Ti, 3% Mn, 0.6% Al, 0.2% V). Information on the behavior of the samples was obtained, studying how the composition of the materials and the presence of iron or manganese has an effect on the corrosion resistance when submerging them in a Ringer Lactate solution after covering the samples in epoxy resin, polishing using carbide emery paper of progressive value of grith (800 to 2500) and a 0.1 alpha alumina suspension applied on a polishing cloth in order to obtain a mirror finish. The corrosion potential of the samples was analyzed in order to study how the phenomenon of corrosion occurs in each sample. In order to compare which one of the two materials possesses a better resistance to the effects of corrosion, studies of electrochemical impedance spectroscopy were performed for different values of potential. Images of the surfaces of the alloys after applying Kroll reactive were obtained through the use of a microscope in which 100 magnifications was applied in order to reveal the structure of the surface.

Keywords: speed, corrosion, metallography, Kroll, microscope.

References:

- [1] ASTM E3-11(2017) Standard Guide for Preparation of Metallographic Specimens, ASTM International, West Conshohocken, PA, (2017).