

NEW OPTION FOR BIOMATERIALS OF MEDICAL PROSTHESIS AND IMPLANTS

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1 COMPOSITION OF THE ELEMENTS

	Wt.%					
	Mo	Ta	Ti	Zr	Nb	Fe
BioHEA 1	20.45	32.45	12.67	18.97		15.46
BioHEA 2	17.32	38.95	13.21	17.45	13.07	

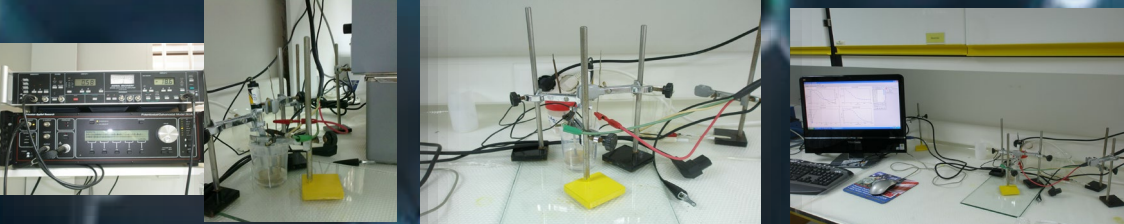
2 PRECISION CUTTING MACHINE



3 PRESS AND METALLOGRAPHIC POLISHER



4 ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY TEST



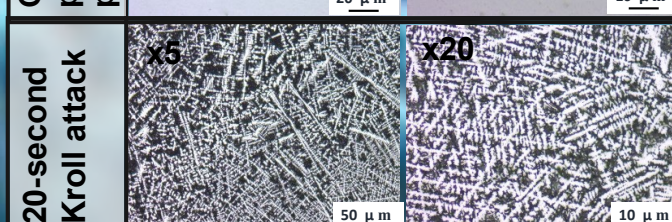
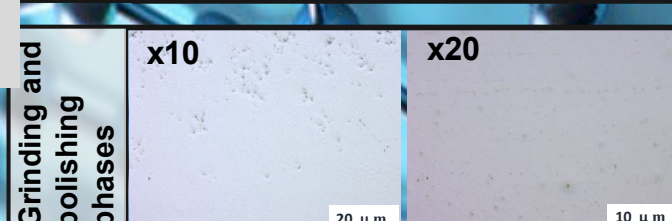
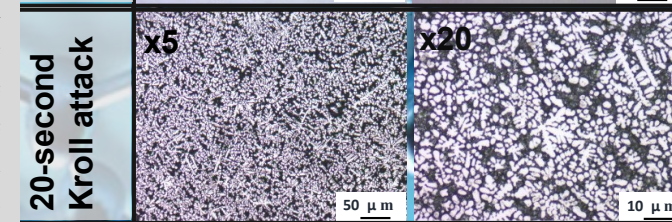
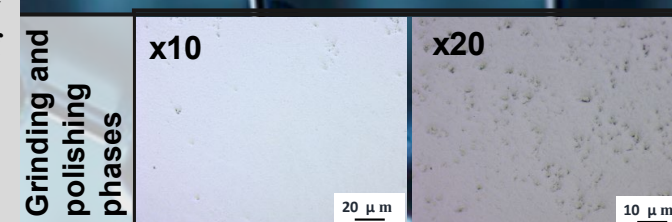
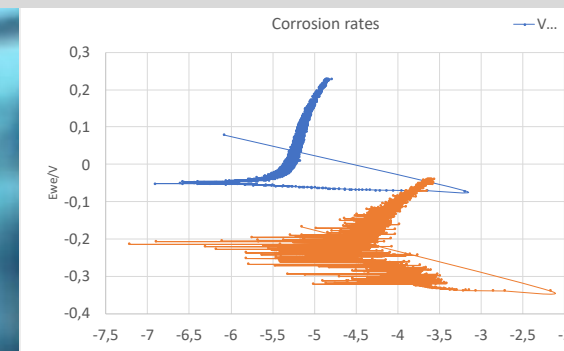
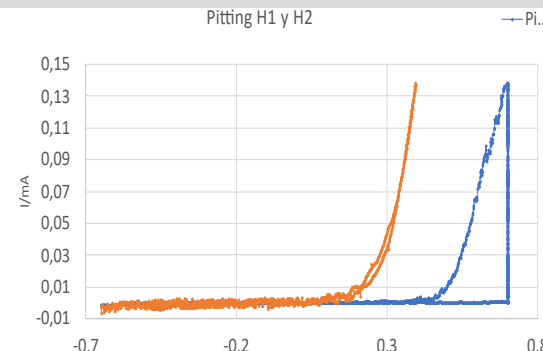
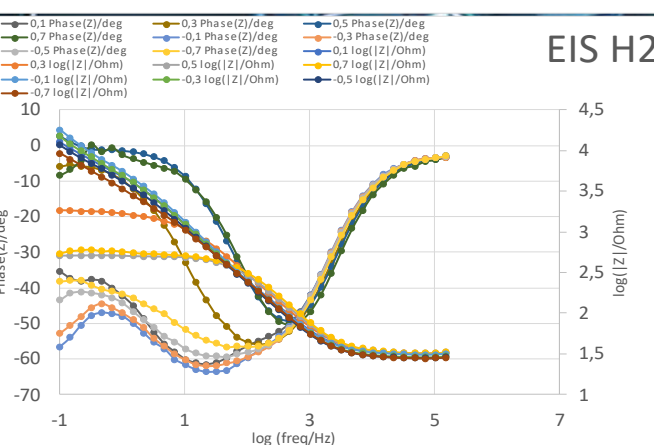
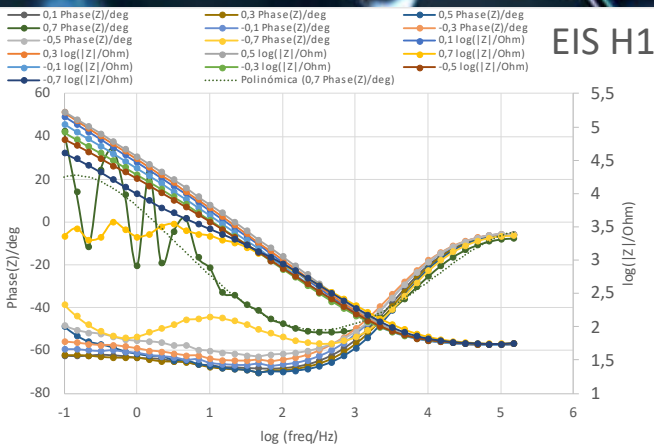
5 CHEMICAL ATTACK AND METALLOGRAPHIC ANALYSIS

The behavior of two High Entropy Alloys of different composition, in simulated body fluid, is studied in order to determine whether these alloys are suitable for use in the field of medical prosthesis and implants. The studied materials, have the following composition:

A) 20.45%Mo, 32.45%Ta, 12.67%Ti, 18.97%Zr and 15.46%Fe;

B) 17.32%Mo, 38.95%Ta, 13.21%Ti, 17.45%Zr and 13.07%Nb.

In order to characterize the properties of these two alloys, different electrochemical methods were used. First of them was Electrochemical Impedance Spectroscopy and the analysis of the spectra was carried out by fitting different equivalent circuits to the experimental data. The spectroscopy impedance results were correlated with the microstructure which was characterized by Optical Microscopy, Scanning Electron Microscopy and Energy-dispersive X-ray Spectroscopy. The surface film is non-cytotoxic because is consisted of oxides of high biocompatible elements as Nb, Ta and Ti and all the results demonstrated the potential of the analyzed alloys for biomedical applications.



BioHEA 2