

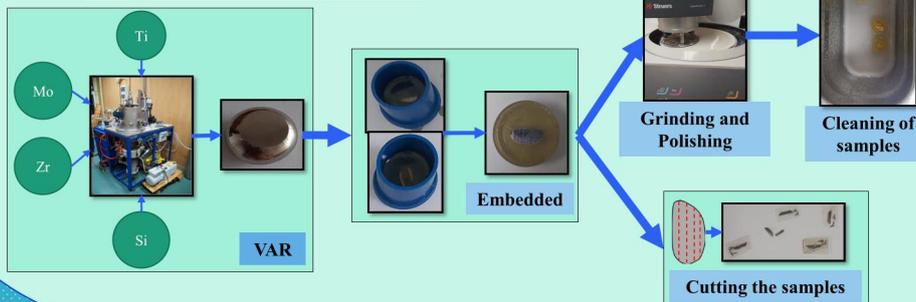
INFLUENCE OF SILICON ADDITION ON THE PROPERTIES OF NEW TITANIUM ALLOYS

Cristina Jiménez-Marcos¹, Santiago J. Brito-García¹, Julia C. Mirza-Rosca^{*1}, Madalina S. Baltatu², Petrica Vizureanu²

¹Mechanical Engineering Dept., University of Las Palmas de Gran Canaria, University Campus of Tafira, Engineering building, 35017, Las Palmas de Gran Canaria, Spain

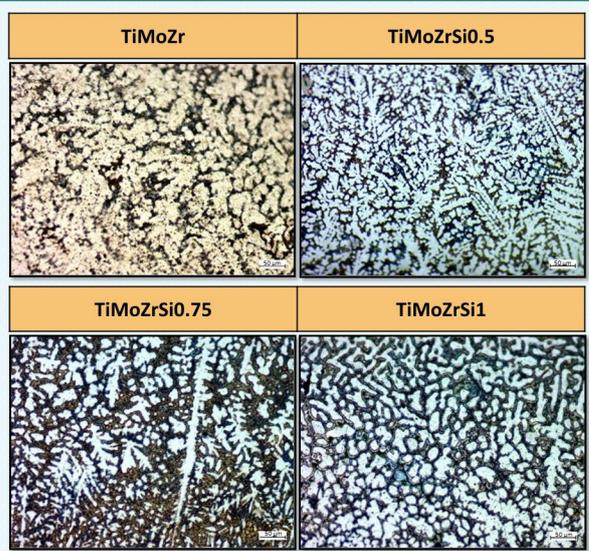
²Department of Technologies and Equipments for Materials Processing, Faculty of Materials Science and Engineering, Gheorghe Asachi Technical University of Iasi, Blvd. Mangeron, No. 51, 700050 Iasi, Romania

SAMPLES PREPARATION



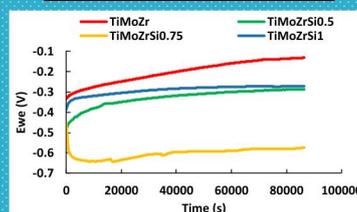
Samples	Ti (%)	Mo (%)	Zr (%)	Si (%)
TiMoZr	73.00	20.00	7.00	-
TiMoZrSi0.5	72.50	20.00	7.00	0.50
TiMoZrSi0.75	72.25	20.00	7.00	0.75
TiMoZrSi1	72.00	20.00	7.00	1.00

MICROSTRUCTURAL CHARACTERIZATION

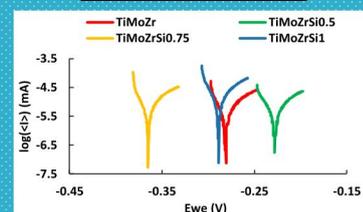


ELECTROCHEMICAL TESTS

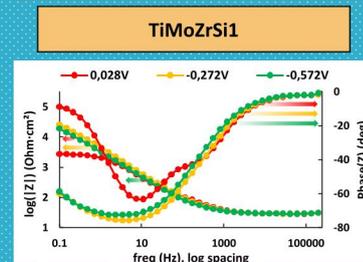
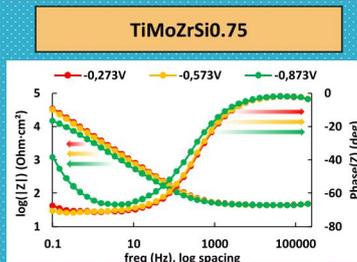
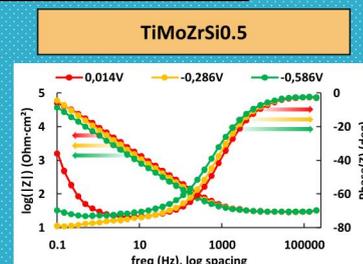
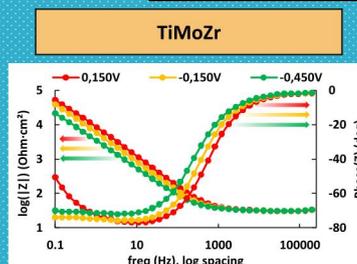
CORROSION POTENTIAL



CORROSION RATE



ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY



THREE-POINT BENDING TEST

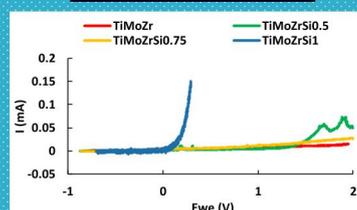
Samples	Modulus of Elasticity (Gpa)
TiMoZr	87 ± 10
TiMoZrSi0.5	49 ± 12
TiMoZrSi0.75	54 ± 6
TiMoZrSi1	83 ± 22

MICROHARDNESS

Load (g)	TiMoZr		TiMoZrSi0.5	
	Soft phase	Hard phase	Soft phase	Hard phase
5	174	343	275	357
25	192	386	323	371
50	318	374	323	366

Load (g)	TiMoZrSi0.75		TiMoZrSi1	
	Soft phase	Hard phase	Soft phase	Hard phase
5	214	365	115	243
25	239	383	137	366
50	319	399	158	356

PITTING POTENTIAL



CONCLUSIONS

Metallographic analysis showed that both samples had biphasic and dendritic structures. According to electrochemical tests in body simulation fluid, the samples' corrosion resistance increases with decreasing silicon content and the samples present a double-layer passive film. The values of modulus of elasticity are lower than those commercial alloys and nearly to the cortical human bone. The microhardness test showed that the samples' surfaces had soft and hard phases.