

# EVALUATION OF THE CHEMICAL AND MECHANICAL PROPERTIES OF TI-MN ALLOYS IN SIMULATED ACIDIFIED BODY FLUID

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University of Las Palmas de Gran Canaria - Spain



Cristina Jiménez-Marcos<sup>1,\*</sup>, Julia Claudia Mirza-Rosca<sup>1</sup>, Clara Mihaela Soare<sup>2</sup> and Ionelia Voiculescu<sup>2</sup>

<sup>1</sup> *Mechanical Engineering Department, Las Palmas de Gran Canaria University, Las Palmas de Gran Canaria, Spain*

<sup>2</sup> *Quality Engineering and Industrial Technology Department, University Politehnica of Bucharest, Bucharest, Romania*

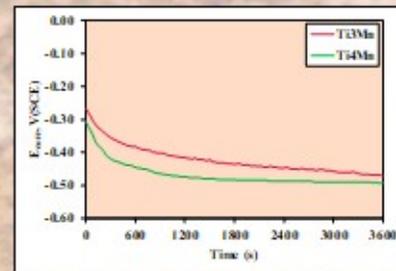


## OBJECTIVE

In this study, the microstructure, hardness, and corrosion behavior in simulated acidified body fluid of titanium-manganese alloys (Ti3Mn and Ti4Mn) were analyzed due to their remarkable specific strength, deformability and cold resistance, to determine their potential as biomaterials for medical applications.

## ELECTROCHEMICAL TESTS

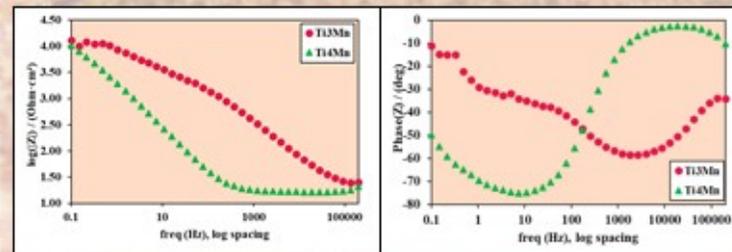
### CORROSION POTENTIAL



### CORROSION RATE

Samples	$E_{corr}$ (mV vs. SCE)	$I_{corr}$ (μA)	$\beta_a$ (mV/dec)	$\beta_c$ (mV/dec)	$R_{pct}$ (Ohm)	CR (mm·year <sup>-1</sup> )
Ti3Mn	-491.46	0.18	17.3	16.5	$2.00 \cdot 10^6$	$7.34 \cdot 10^{-4}$
Ti4Mn	-485.32	0.12	12.2	16.2	$2.51 \cdot 10^6$	$1.93 \cdot 10^{-3}$

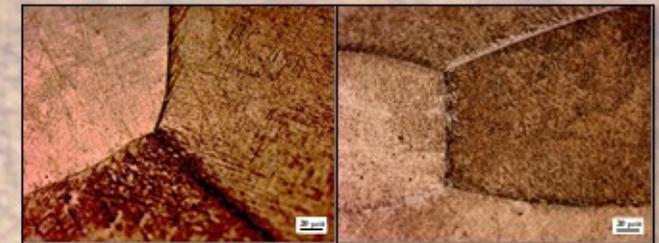
### ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY



## METALLOGRAPHY TEST

Ti3Mn

Ti4Mn



## MICROHARDNESS TEST

Samples	Essay	Microhardness (HV)				
		Mean	Median	SD	Maximum	Minimum
Ti3Mn	5 gf	299	301	20	347	263
	25 gf	322	320	17	357	301
	50 gf	333	334	15	363	315
Ti4Mn	5 gf	317	321	30	361	255
	25 gf	351	351	24	394	312
	50 gf	345	337	16	386	321

## CONCLUSIONS

- Structures with equiaxed grains with clearly defined boundaries, characteristic of a titanium  $\alpha + \beta$  phase mixture.
- Microhardness values were higher for Ti4Mn sample.
- Electrochemical tests demonstrated high corrosion resistance.
- Ti-Mn alloys have the potential to become inexpensive and promising biomaterials for use in biological applications.

## EXPERIMENTAL PART

