

NANOCOMPOSITE TI-ALLOYS FOR BIOMEDICAL APPLICATIONS, CHARACTERIZATION, CORROSION BEHAVIOR AND BIOCOMPATIBILITY

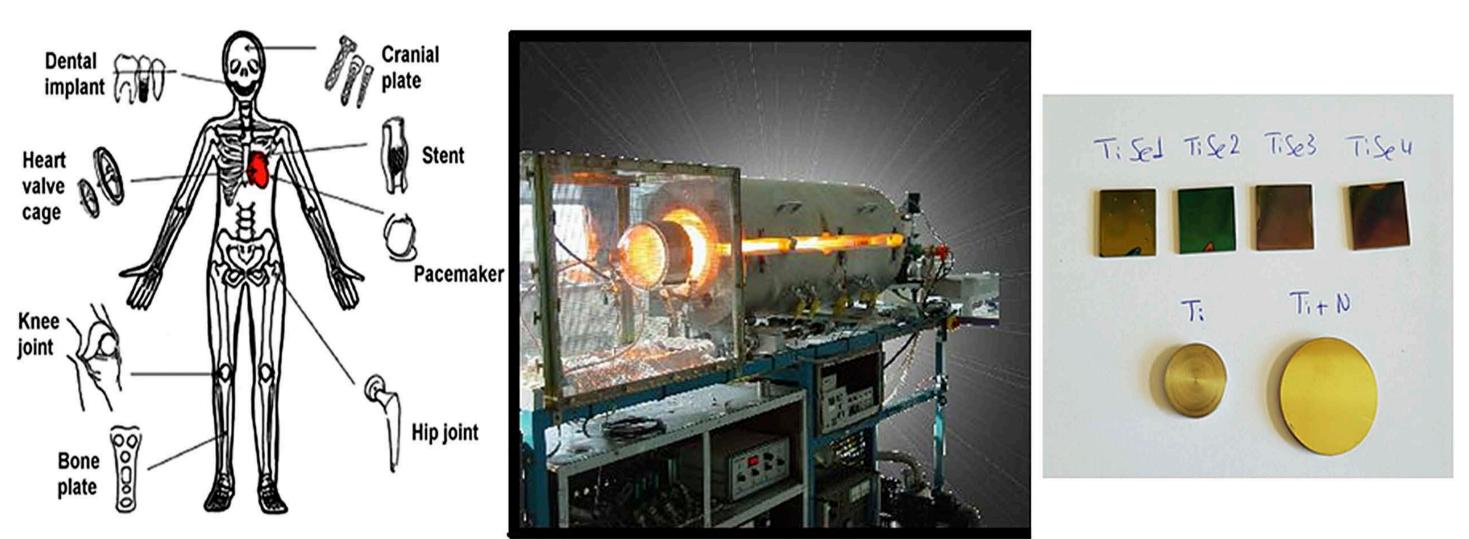
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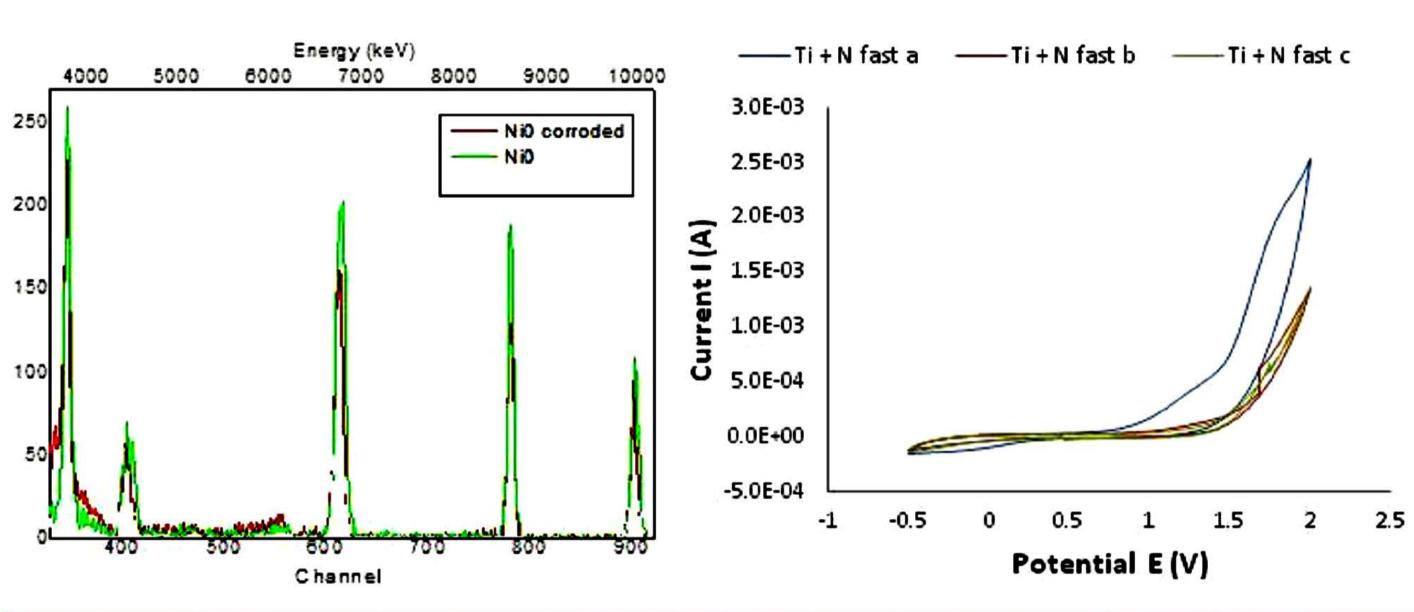
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Sample	Surface modification	Density	Structure	Coating
	technique	(g/cm³)		thickness (nm)
Ti	TiAlV	4.43	crystalline	-
Ti Se 1	TiAIV+SiC sputtering(25°C)	3.50	amorphous	300
Ti Se 2	TiAlV+SiC DIM (25°C)	3.50	crystalline	270
Ti Se 3	TiAlV+SiC sputtering (700°C)	3.21	Nanocrystalline β-SiC	330
Ti Se 4	TiAlV+SiC DIM (700°C)	3.20	Nanocomosite cubic	310
Ti + N	TiAlV+N-Ni plasma nitridation	4.40	Nanocomosite	500
	DIM (300 °C)		amorphous	

Figure 1: a) biomedical applications of Ti-alloys, b) surface modification by plasma nitridation, c) the investigated samples and d) table of the samples with their characteristics.



sample	Imax (A)	Ecorr (mV)
Ti	10-2	-130
Ti Se 1	2.5 10-3	-70
Ti Se 2	3.5 10-5	10
Ti Se 3	9 10-4	-70
Ti Se 4	7 10-4	150
Ti + N	2 10-3	460

Figure 2: a) Determination of the nitrogen in nanocomposite Ti+N sample using nuclear reaction analysis, b) cyclic voltammetry curves of the Ti+N sample and c) table with the corrosion characteristics of the samples.

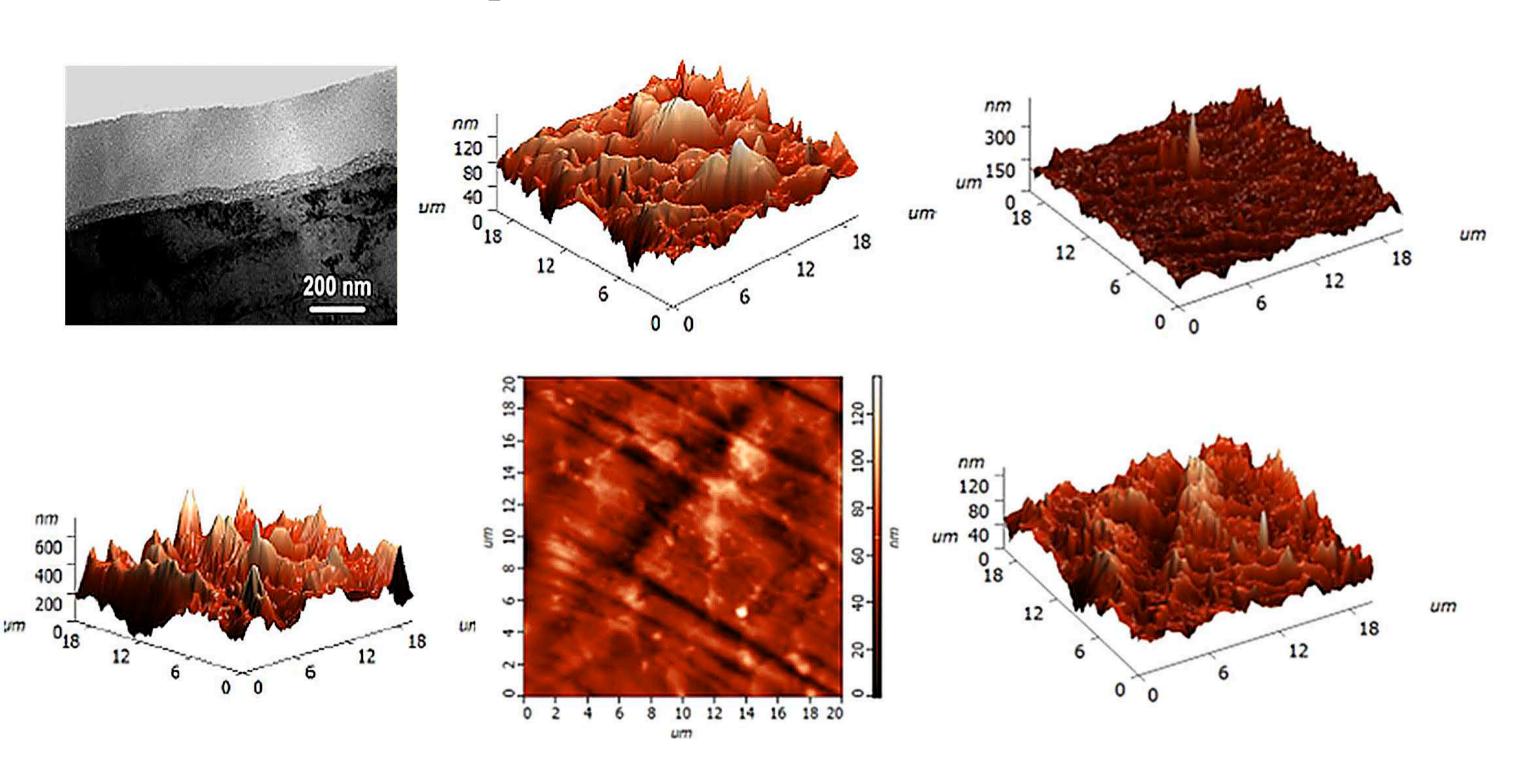


Figure 3: a) TEM image of the Ti Se4, b-c) AFM images of the TAV before and after corrosion, AFM images of the Ti Se4 before (d) and after corrosion (e-f).

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	sample	Concentration of released metal (µg/L)		
1		Ti	Al	V
THE TOTAL PROPERTY OF THE PARTY	Ti	154.8	257	27.6
	Ti Se 1	13.8	128	20.2
	Ti Se 2	8.6	86	13.4
7	Ti Se 3	11.8	116	13
9	Ti Se 4	10.9	103	13.1
	Ti + N	78.4	122.8	16.6

Figure 4: Concentration of released metal (μg/L) in corrosive solution (0.9% NaCl) after electrochemical investigation.

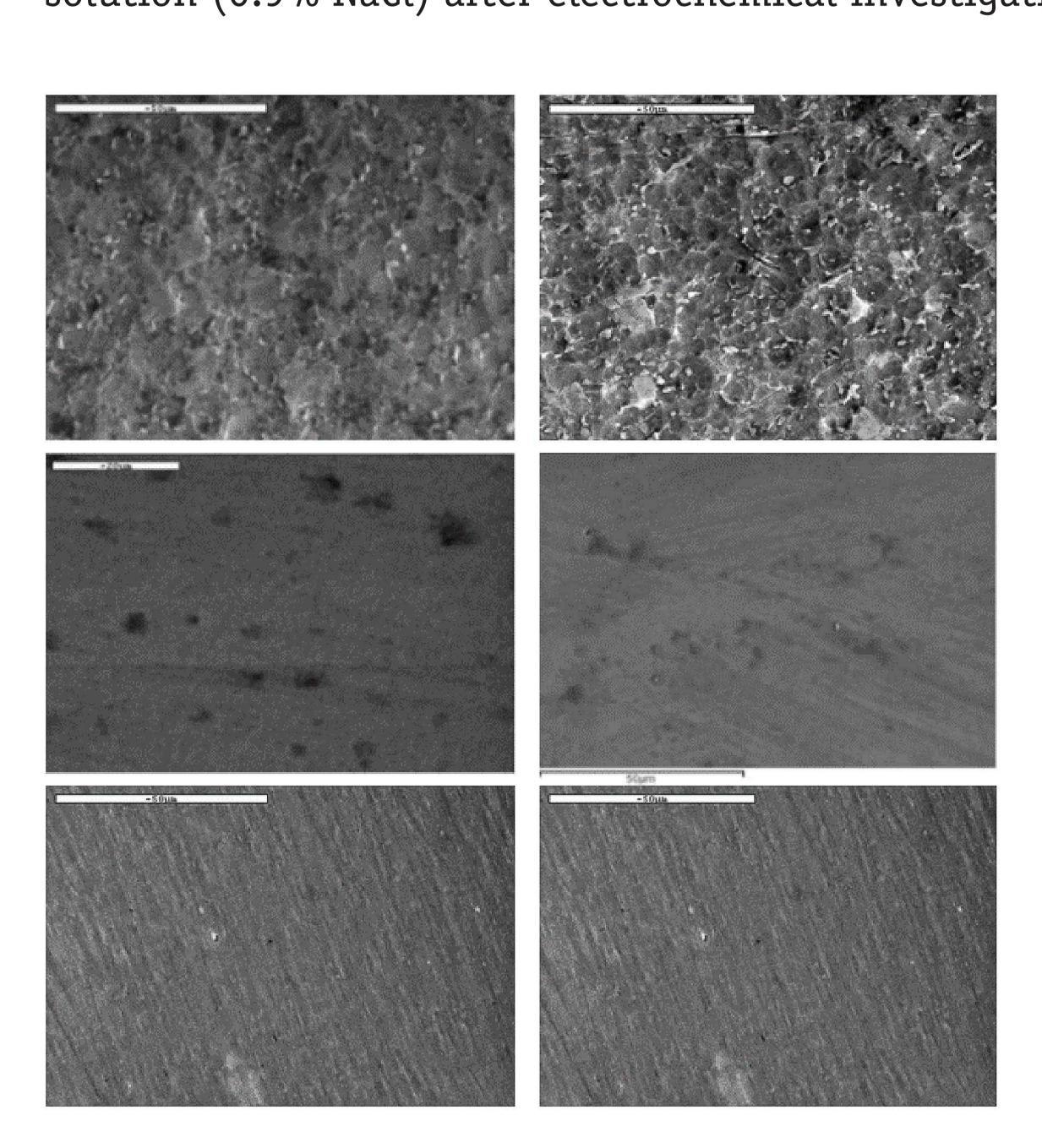


Figure 5: SEM images of non corroded and corroded samples respectively, TAV (a-b), Ti+N (c-d), Ti Se4(e-f).

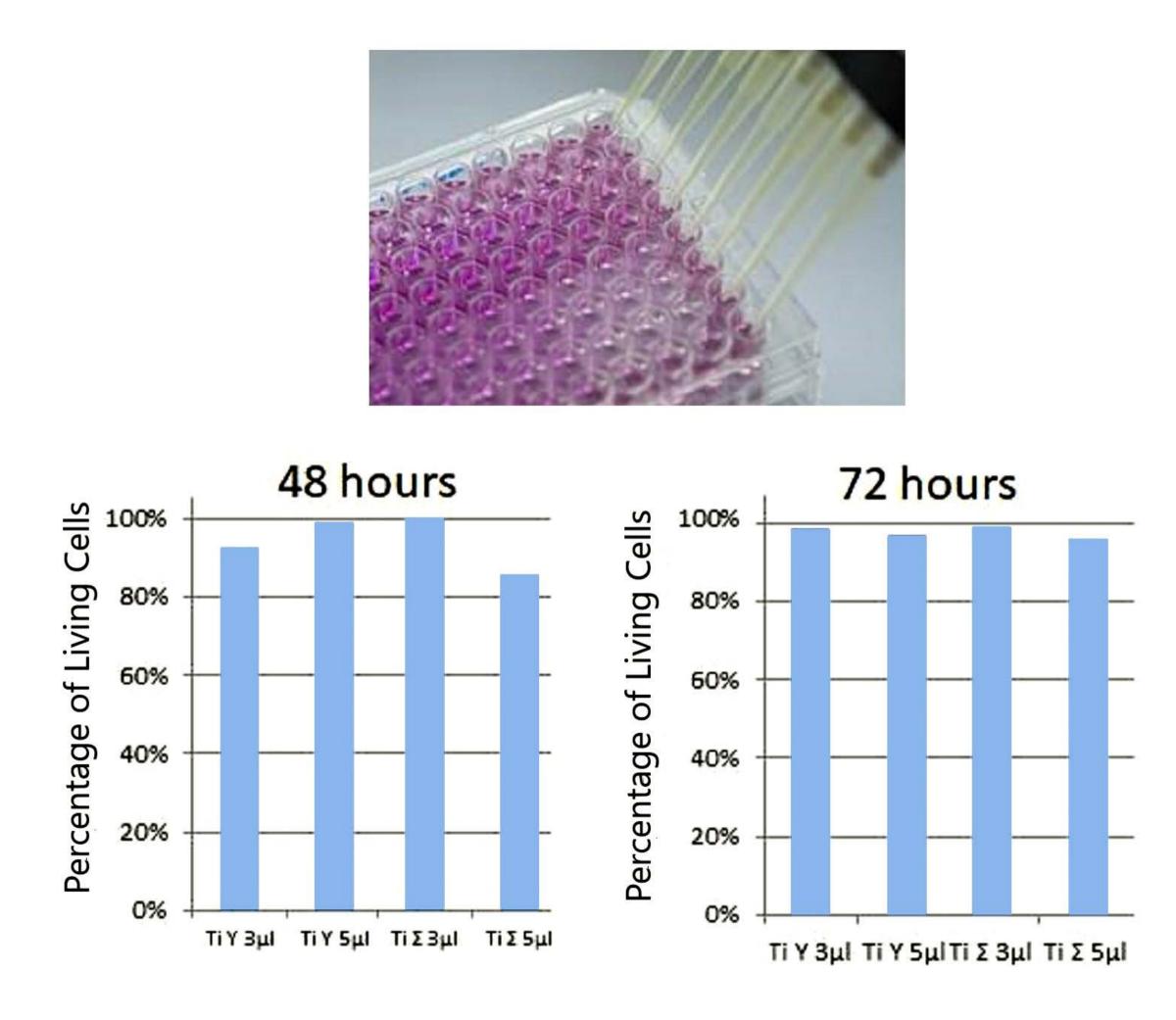


Figure 6: Cytotoxicity diagrams of TAV.