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**خوردگی حفره‌ای آلومینیم خالص تجارتي و ماده مرکب  
Al-TiB<sub>2</sub> در محلول یک مولار کلرید سدیم**

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TiB

Al-TiB

(E<sub>pit</sub>)

Al TiB Al TiB

E<sub>pit</sub>

## **Pitting Corrosion of Commercially Pure Aluminum and Al-TiB Composite in M Sodium Chloride Solution**

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### **Abstract**

Pitting corrosion of commercially pure aluminum and aluminum metal-matrix composite reinforced with TiB particles were investigated in M sodium chloride solution. The electrochemical methods used in this investigation were potentiodynamic and potentiostatic techniques. Potentiodynamic polarization tests were carried out in naturally aerated and deaerated solutions using various potential scan rates. The influence of bubbling nitrogen gas in solution and various potential scan rates were investigated, both for commercially pure aluminum and Al-TiB composites. Potentiostatic polarization tests were also carried out to determine the exact critical pitting potentials

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(Epit). Results showed that the reinforcing TiB particles had no significant influence on critical pitting potential (Epit) of aluminum matrix. The Epit value of Al-TiB and Al-TiB was only mV lower than pitting potential of commercially pure aluminum. It was also found that during the potentiodynamic polarization tests for Al-TiB composites, deaeration of solution as well as slow scan rate of potential change was necessary for determining the exact Epit values.

**Keywords:** Aluminum metal-matrix composite, Potentiodynamic, Potentiostatic, Pitting

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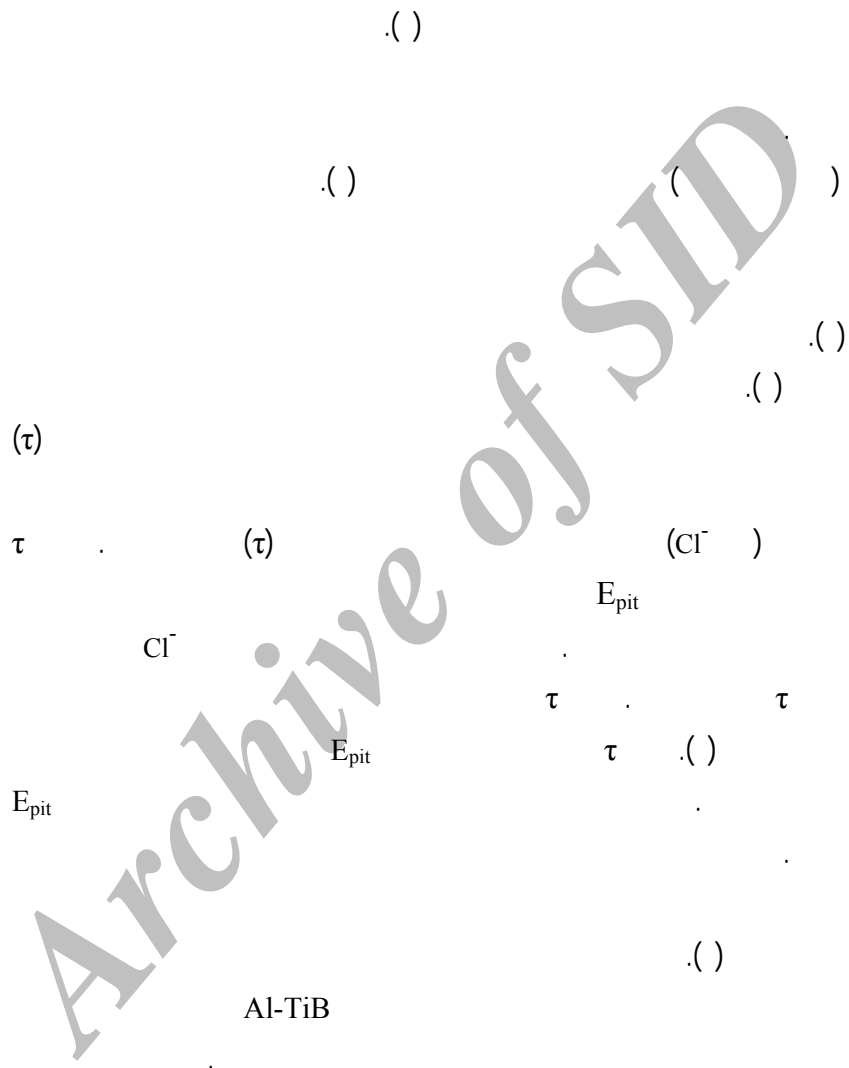
MMCs

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. Metal – Matrix Composites, MMCs  
. High Specific Strenght



- . Pitting Corrosion
- . Crevice Corrosion

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TiB  
(Merck)

TiB  
(pH= / )

Al-TiB

Al-TiB  
(Olympus)  
(EDS)

Al TiB

Al

Al TiB

(EDS)

(Philips XL )

A EG&G

/

K EG&G

+ /

(E<sub>pit</sub>)  
Al TiB Al TiB

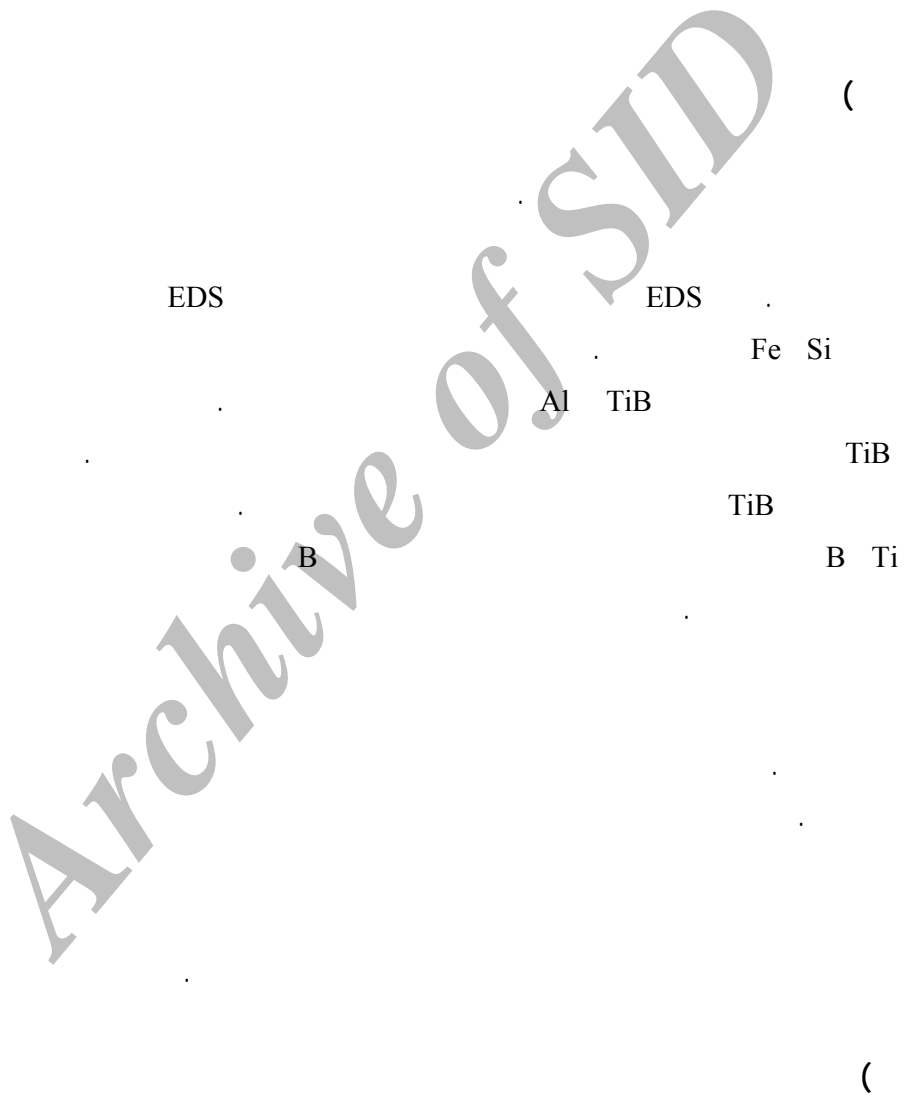
SiC

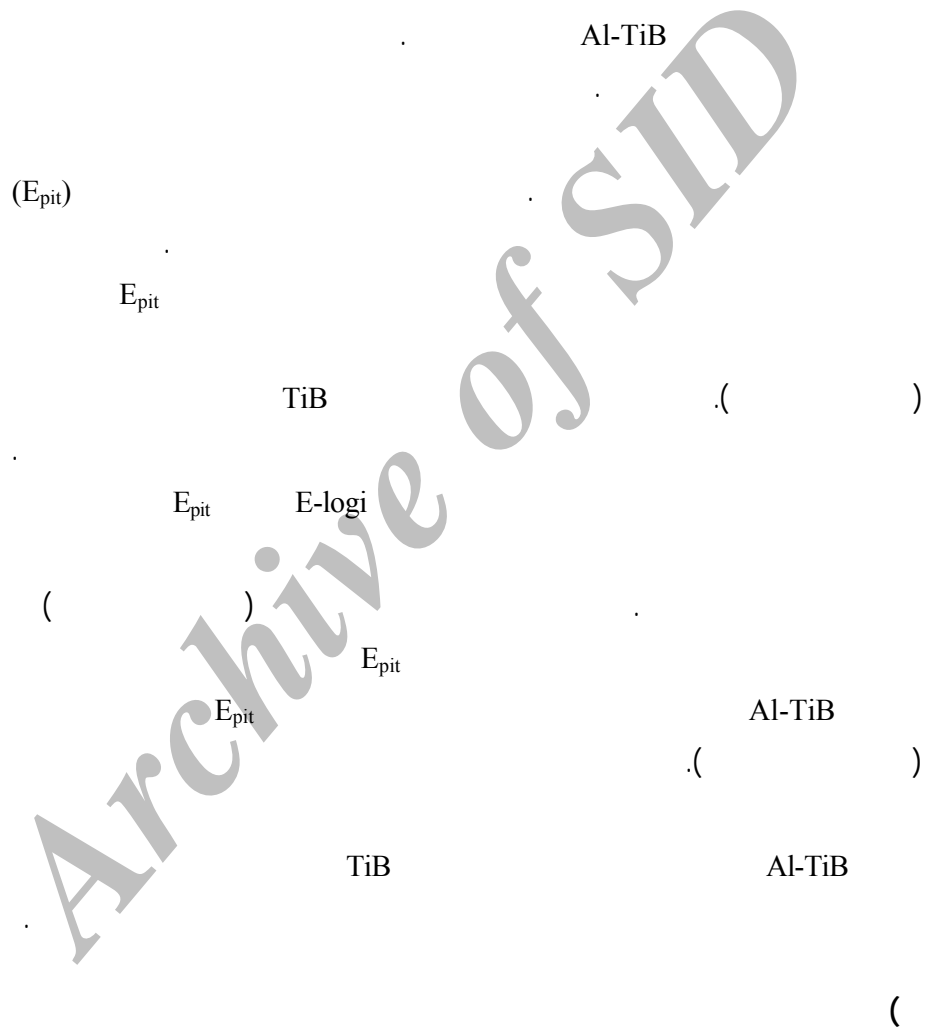
/ Al O

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± mV

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Al TiB

$E_{corr}$

Al-TiB

$E_{corr}$

.( )

$E_{corr}$

( $E_{corr}$ )

Al O

( $E_{pit}$ )

.( )

$E_{corr}$

NaCl

SiC

$E_{pit}$

.( )

( )TiB

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Al Al TiB

TiB

 $E_{pit}$  $E_{corr}$  $E_{pit}$ 

:

mV/min		mV/min		mV/min		mV/min		
$E_{corr}$	$E_{pit}$	$E_{corr}$	$E_{pit}$	$E_{corr}$	$E_{pit}$	$E_{corr}$	$E_{pit}$	
mV <sub>SCE</sub>	mV <sub>SCE</sub>	mV <sub>SCE</sub>	mV <sub>SCE</sub>	mV <sub>SCE</sub>	mV <sub>SCE</sub>	mV <sub>SCE</sub>	mV <sub>SCE</sub>	
								Al TiB
								Al TiB

Al-TiB

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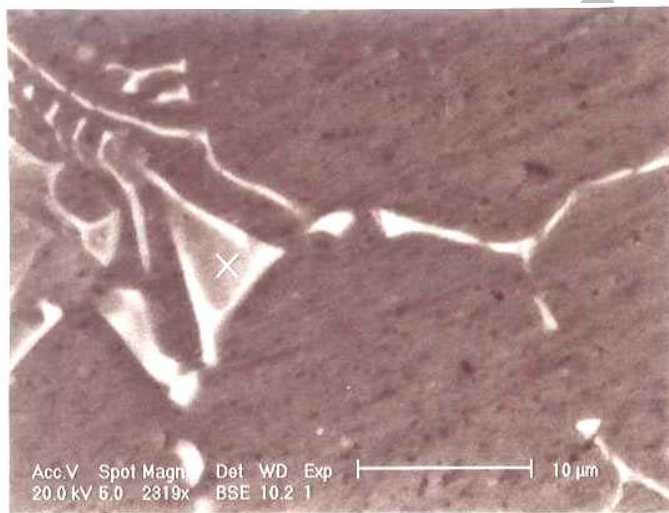
Al TiB	Al TiB		Al TiB	Al TiB		
						mV/min
	/					$E_{corr}$ mV(SEC)
/	/	/	/	/	/	mpy

 $(E_{pit})$ 

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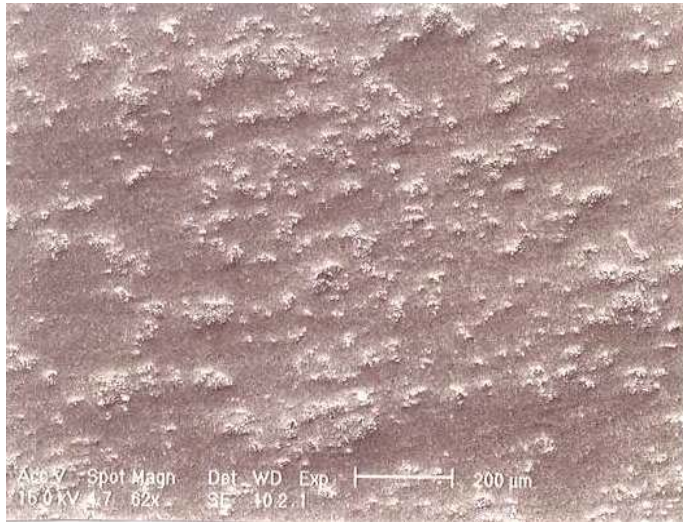
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<b>V(SCE) , E<sub>pit</sub></b>	
/ < E <sub>pit</sub> < /	
/ < E <sub>pit</sub> < /	Al TiB
/ < E <sub>pit</sub> < /	Al TiB



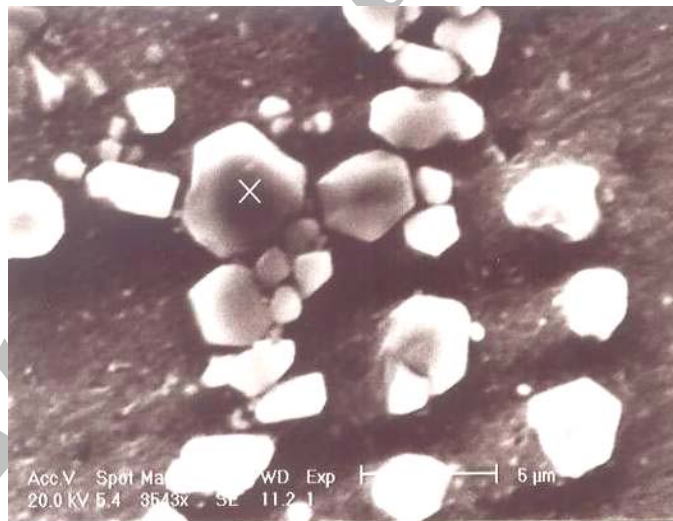
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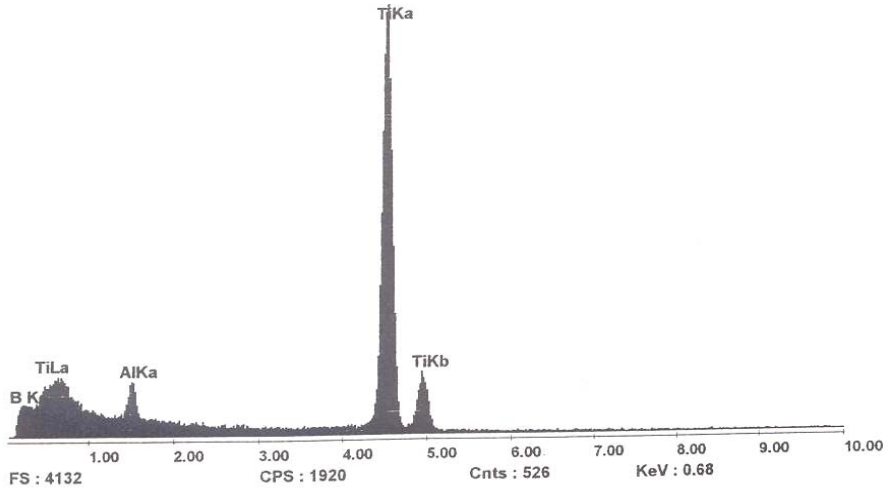


**Al TiB**

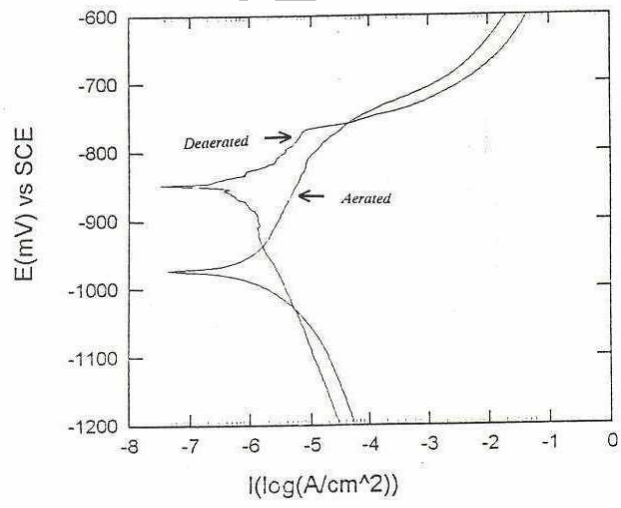
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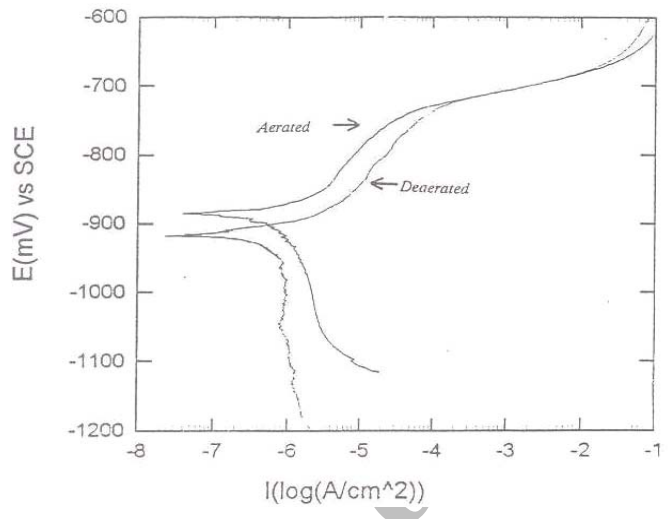


**TiB** :  
**TiB (EDS)**



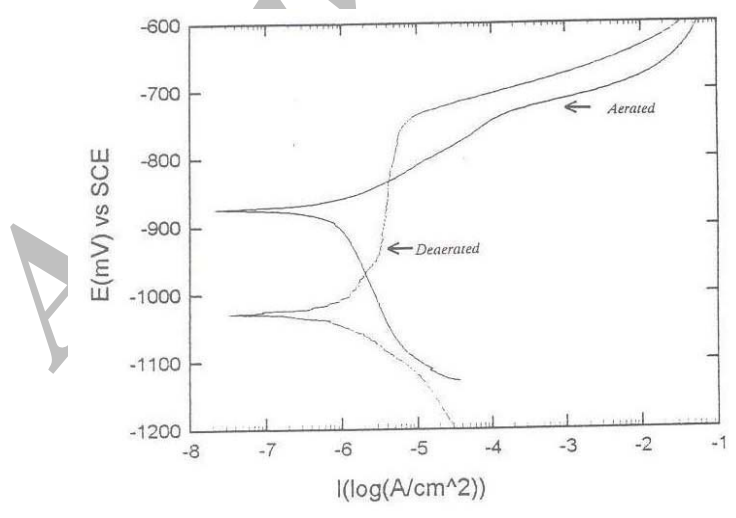
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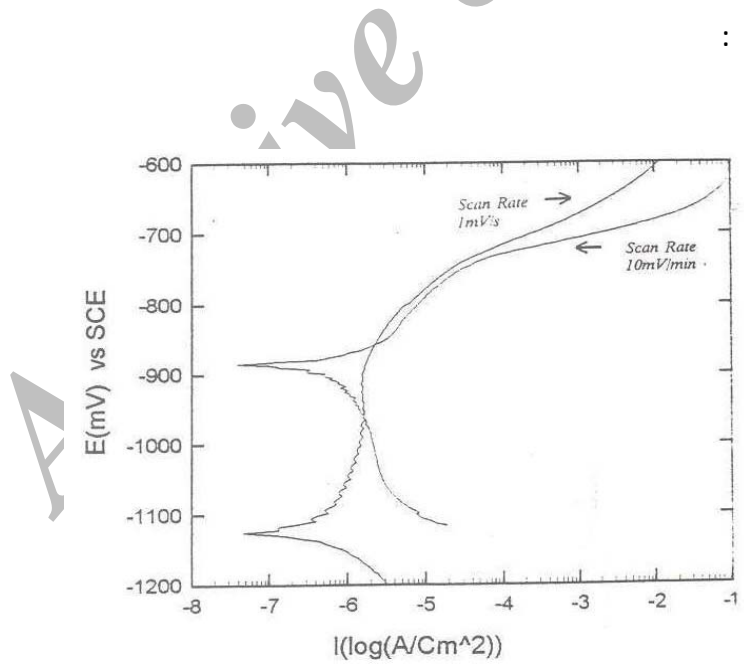
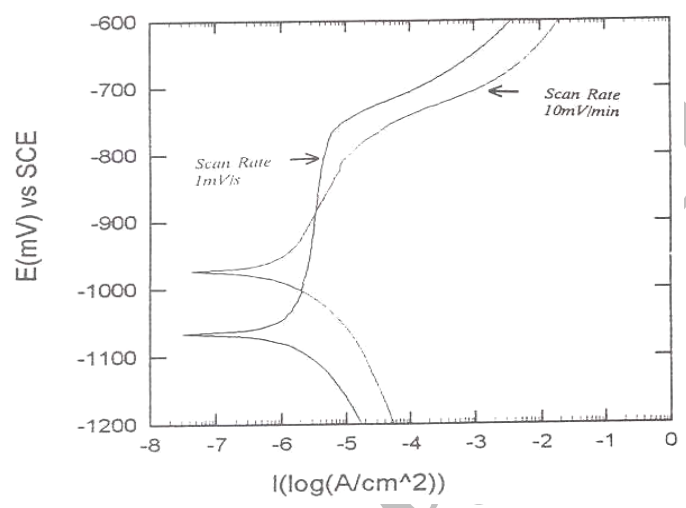
Al- %TiB

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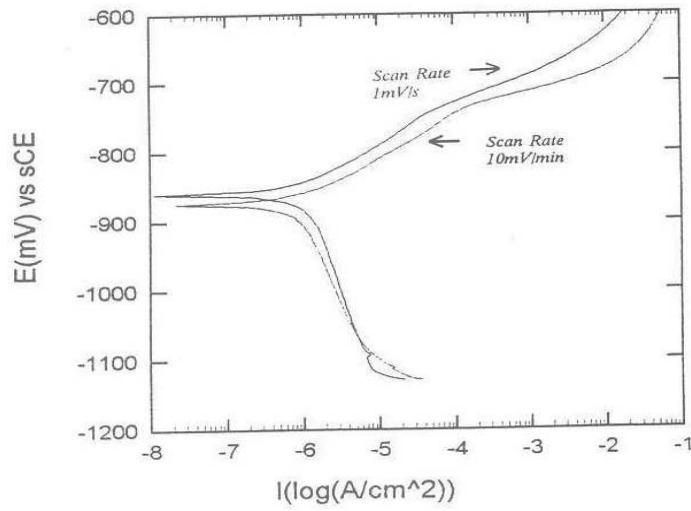


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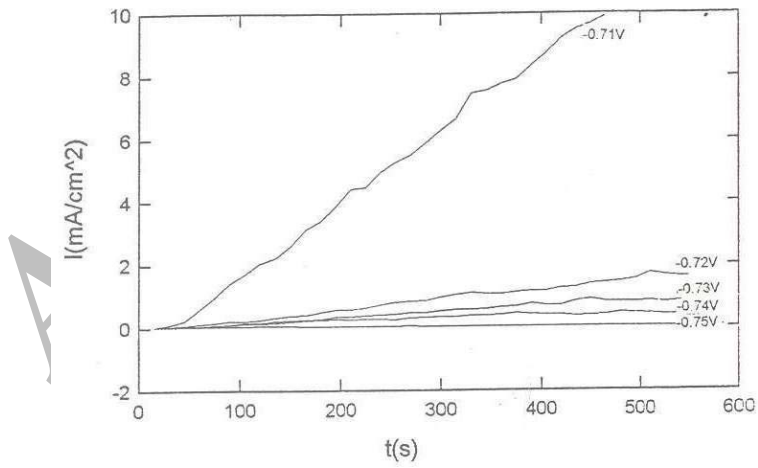
Al TiB :



Al- %TiB :



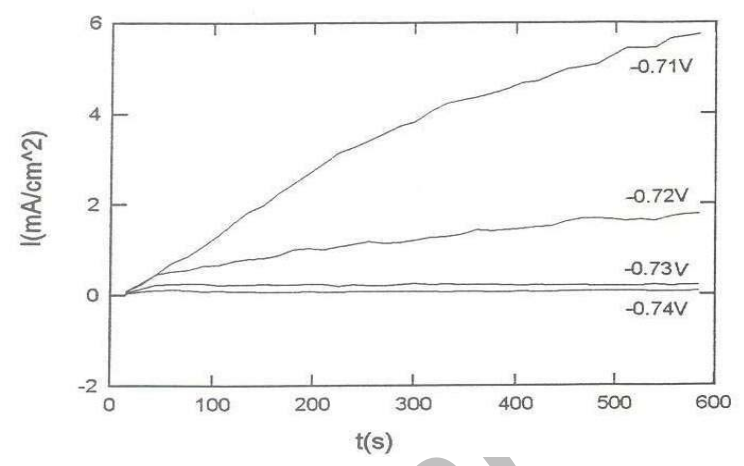
Al TiB :





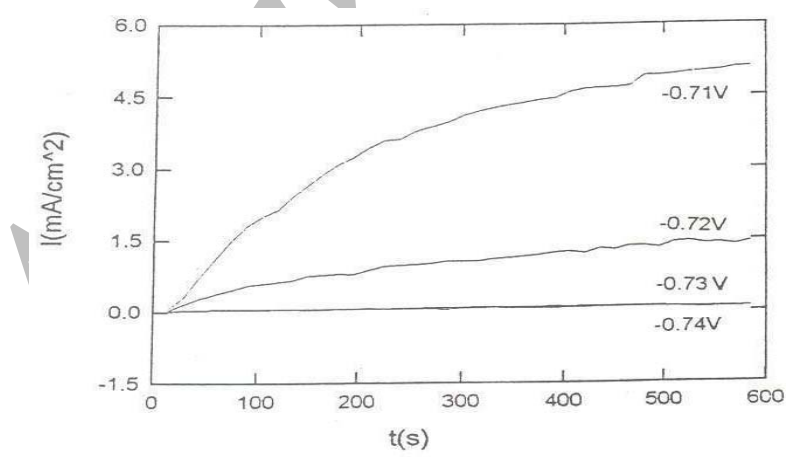
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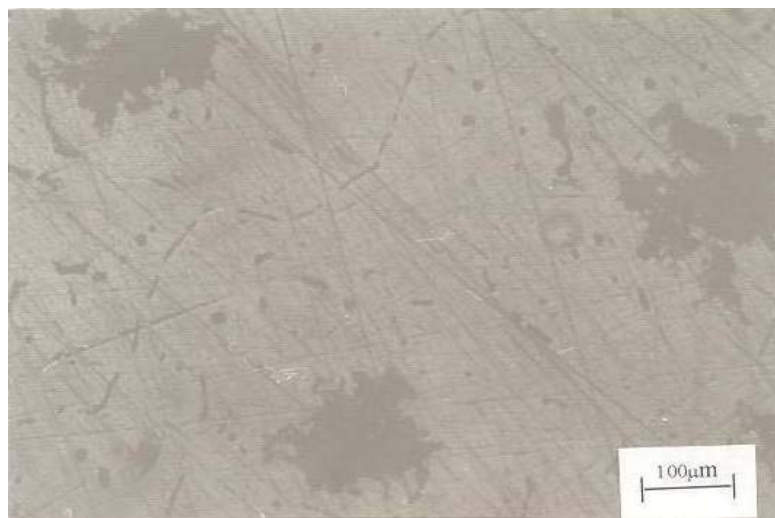
Al- %TiB

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Al TiB :



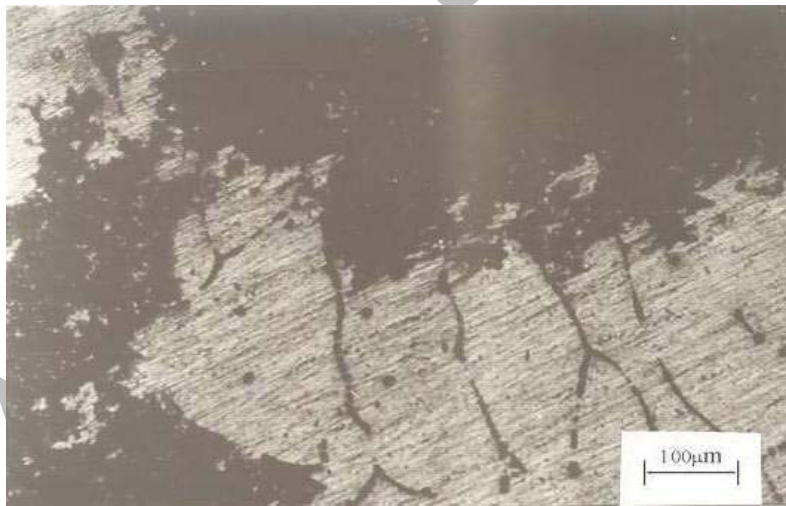
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Al- 10%TiB ( X ) :



( X ) :



Al- %TiB ( X) :

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