Selective Laser Melting of Ti6Al4V-2%Hydroxyapatite Composites

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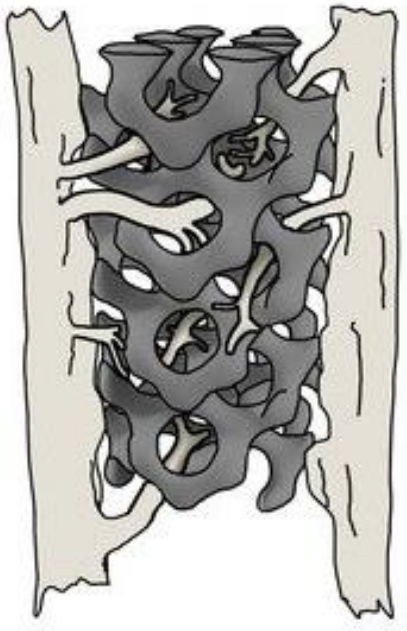
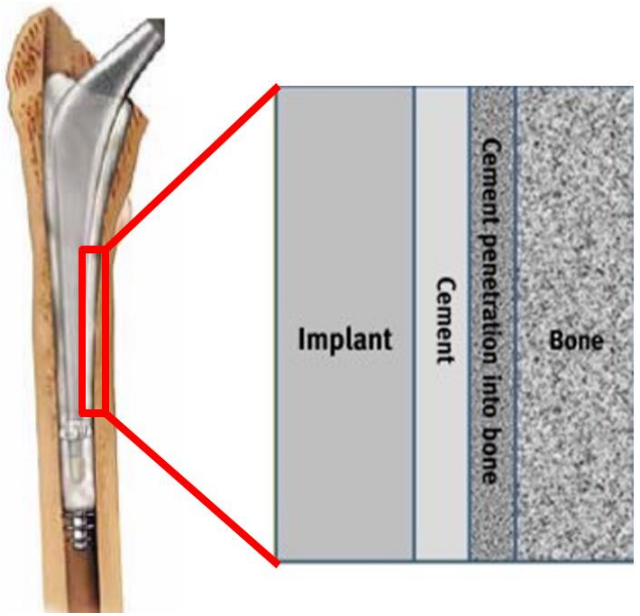
Introduction

The aim of this study



Biological fixation



Bone cement fixation

Mechanical fixation (screws)

Materials and Methods

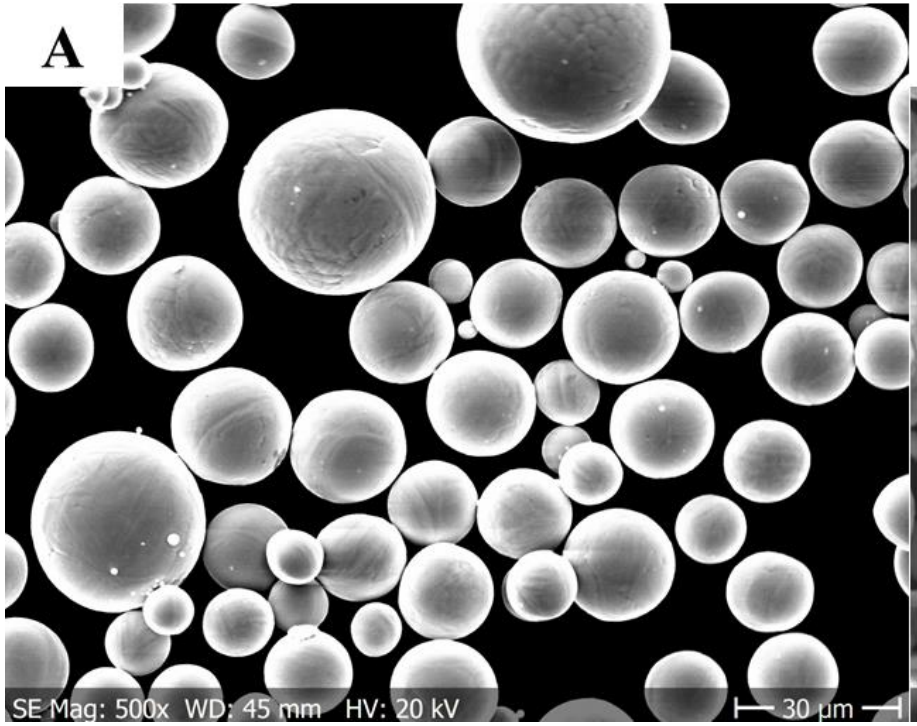


Fig 1: SEM micrograph of pure Ti64 powder

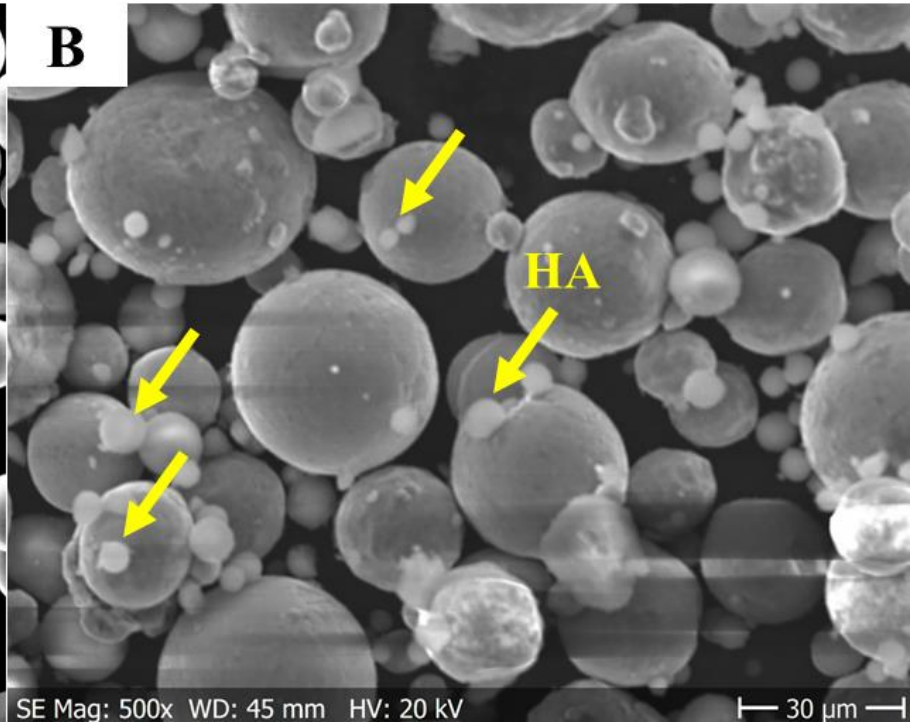
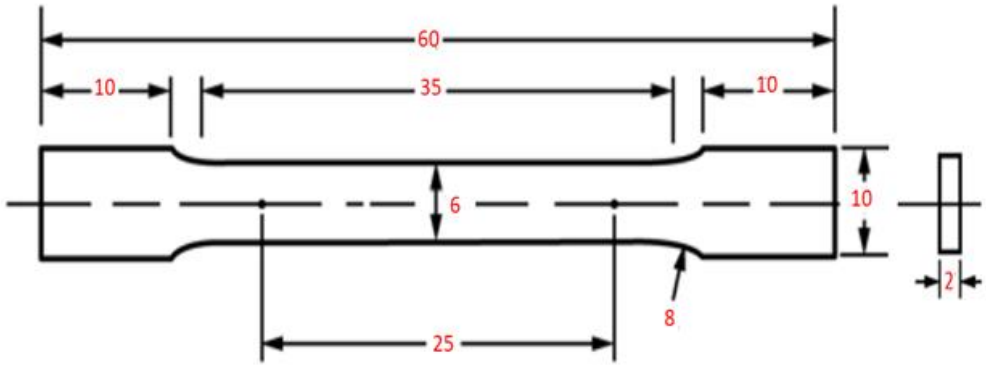
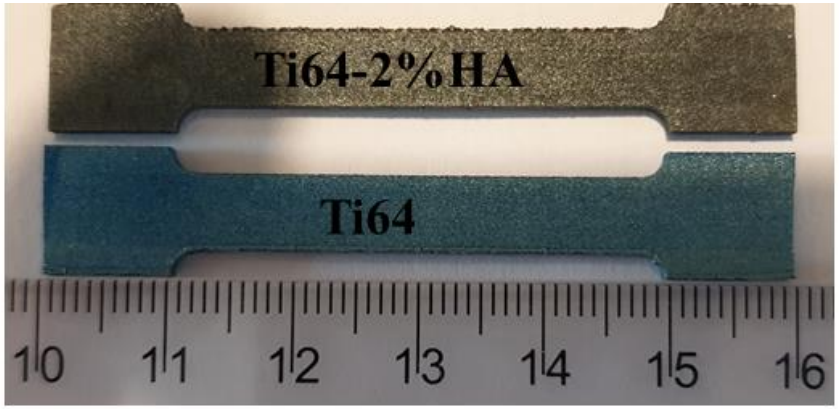


Fig 2: SEM micrograph Ti64 powder mixed with 2 wt% of HA powder

Materials and Methods

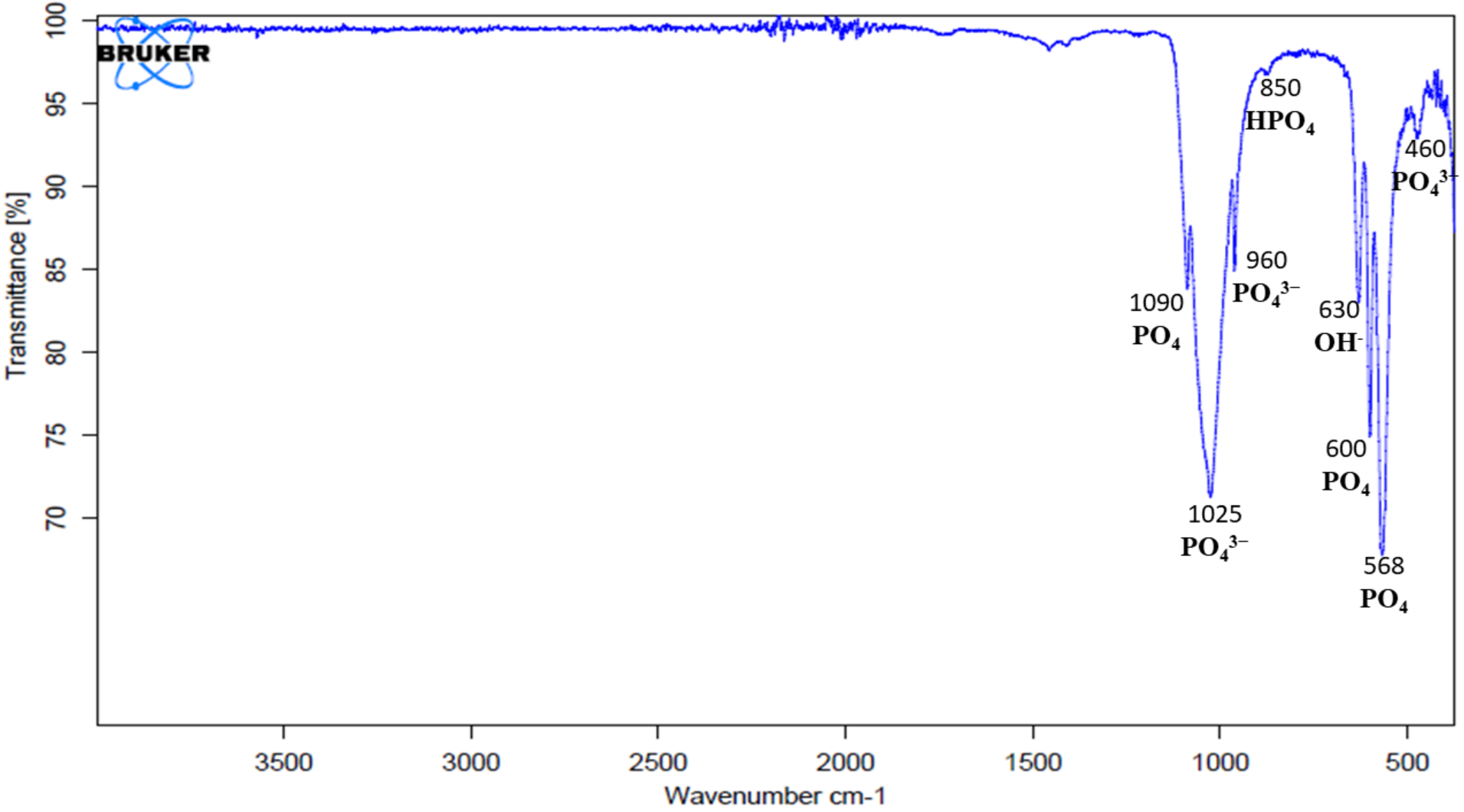




The shape and size of the tensile sample (mm).

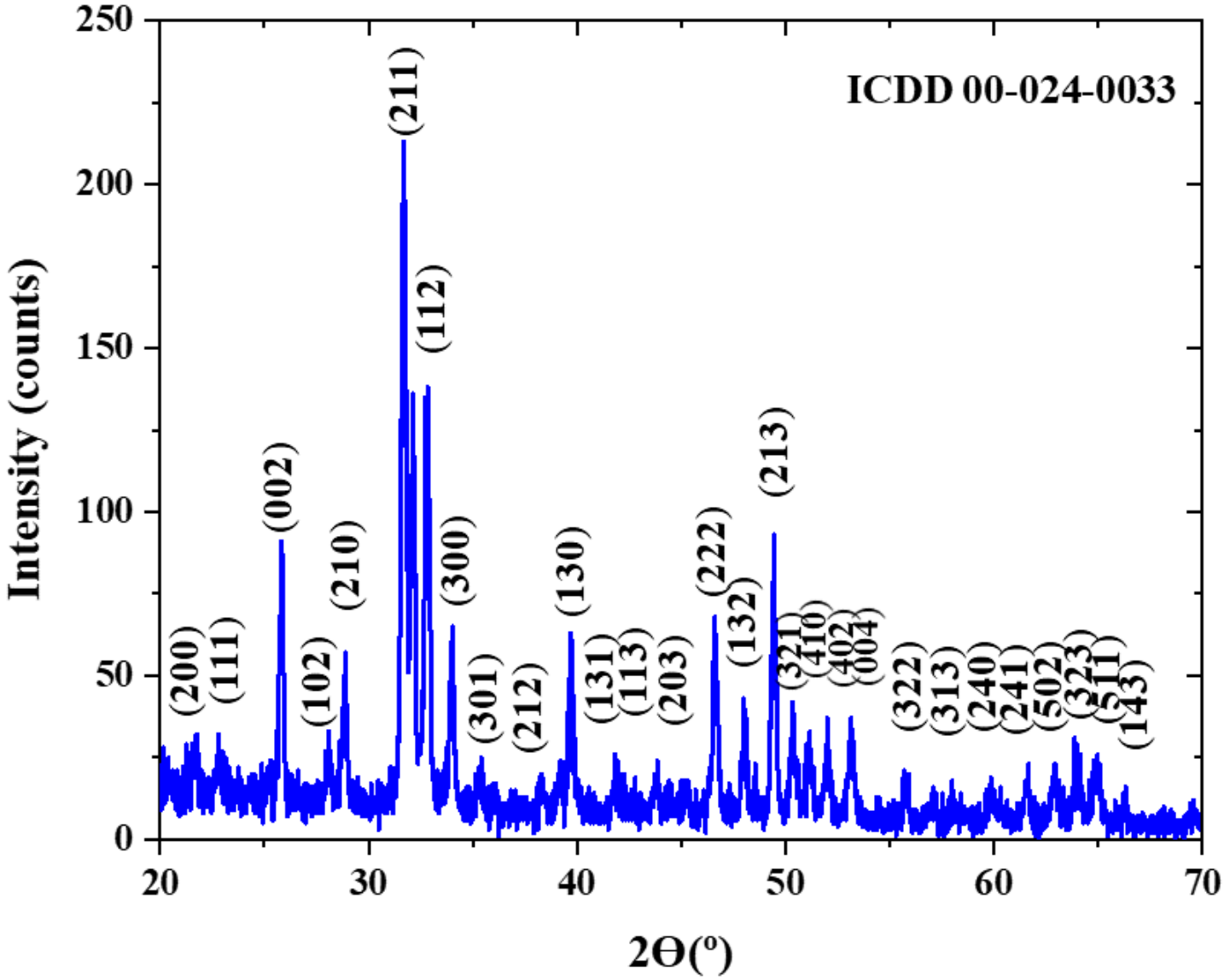
Results and Discussion

FTIR spectra of HA powder heated at 1000 ºC.



Results and Discussion

X-ray diffraction pattern of HA powder heated at 1000 °C.



Results and Discussion

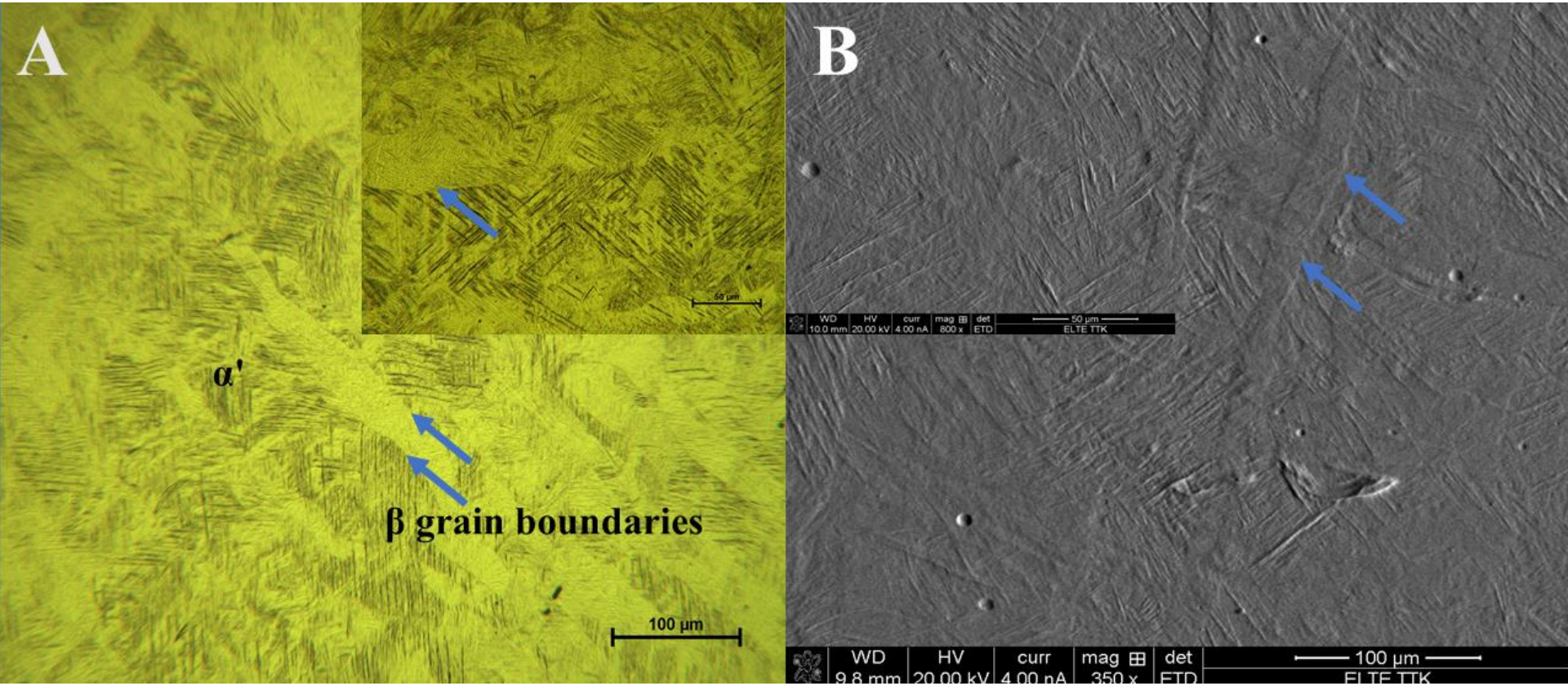
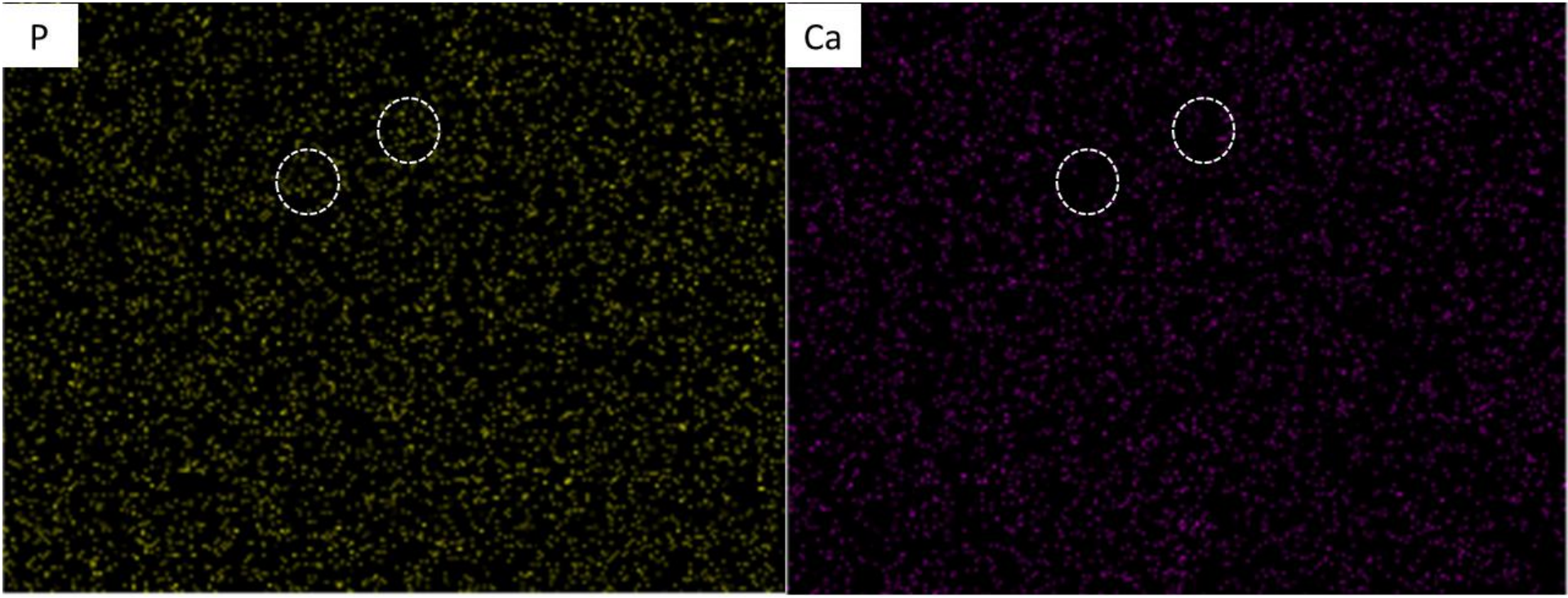


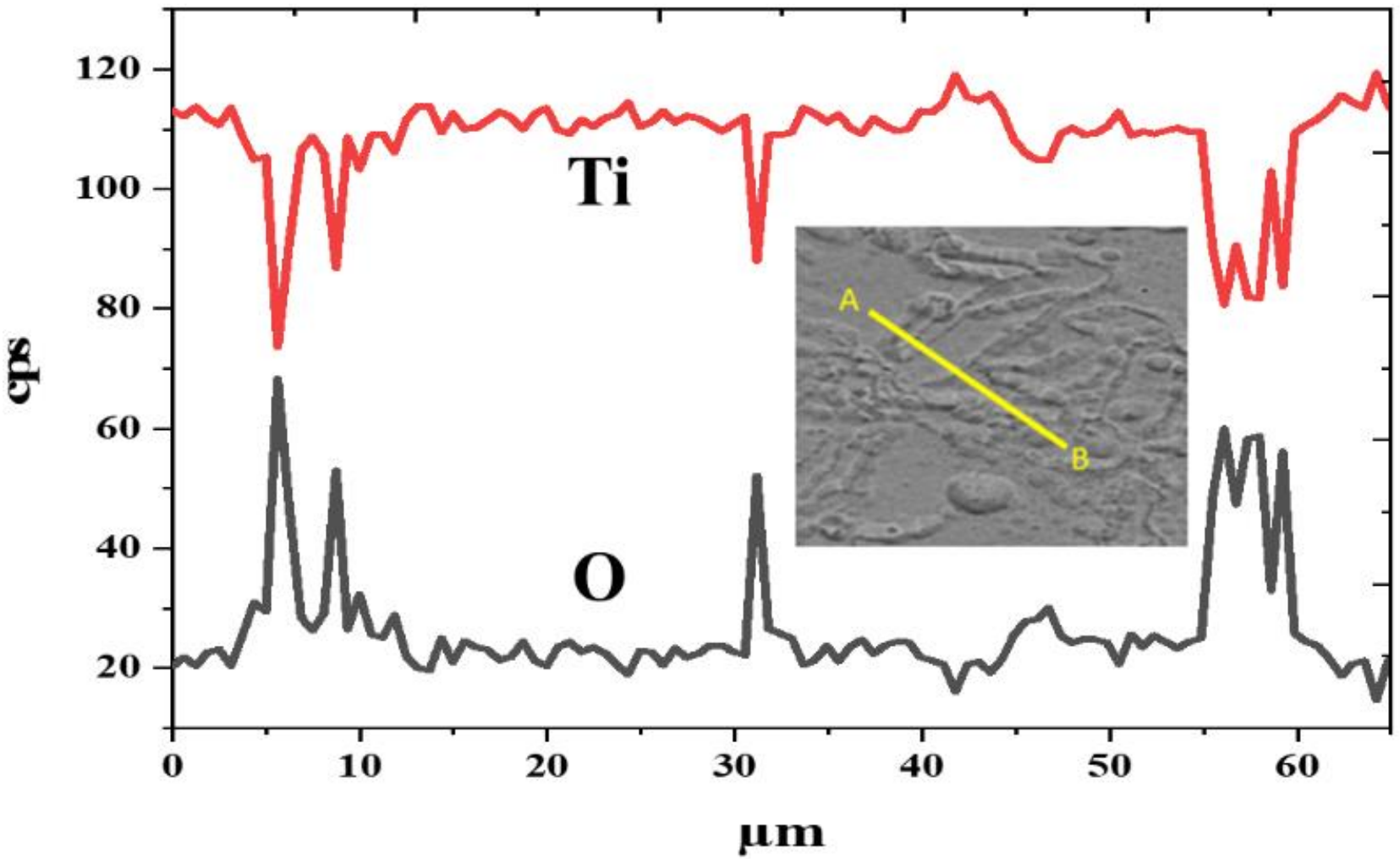
Fig: a), optical image and b), SEM image showing microstructure of the Ti64 manufactured by SLM

Results and Discussion



EDS mapping analysis of SLM Ti64-2%HA composites.

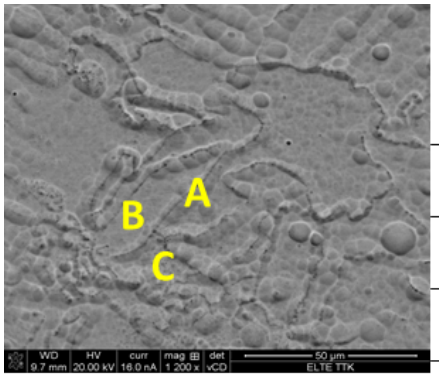
Results and Discussion



EDS line scan across the grain boundaries in structure of SLM Ti64-2%HA composites.

Results and Discussion

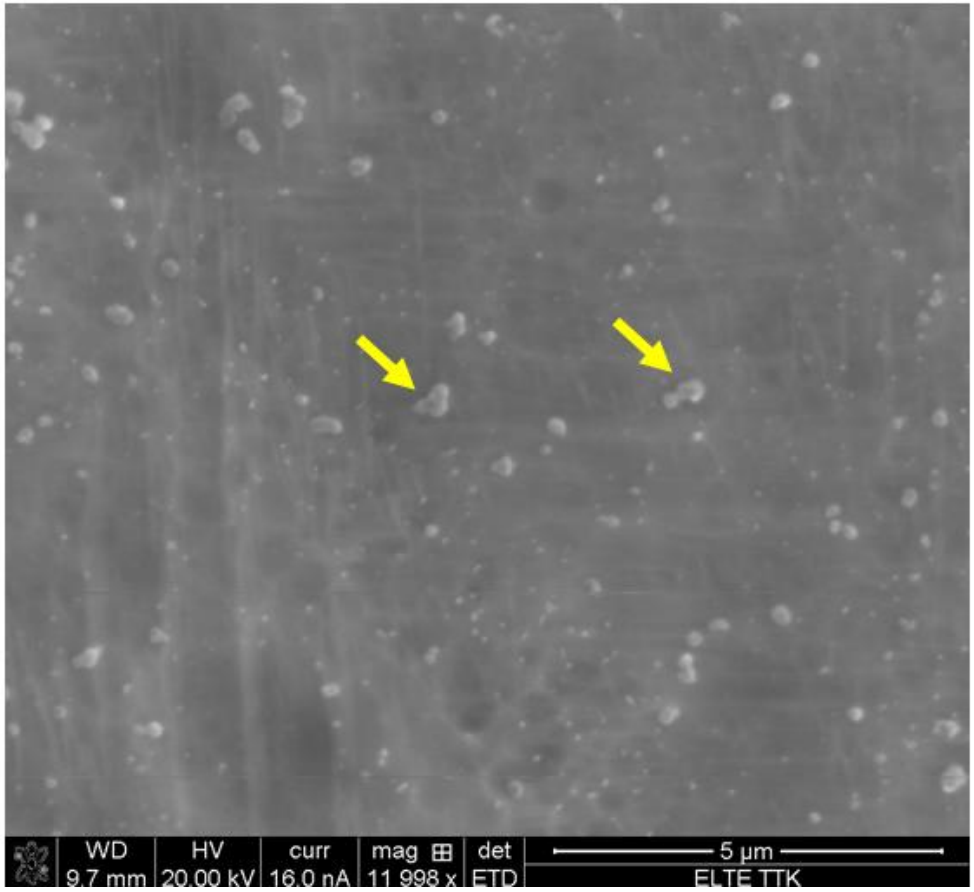
EDS spot analysis of grain boundary (GB) and inside grain domains in in structure of SLM Ti64-2%HA composites



Analysis Points	Element wt%					
	Ti	Al	V	O	P	Ca
A	83.61	4.36	2.58	8.36	1	0.09
B	86.28	7.75	2.57	3.2	0.20	-
C	85.94	7.44	2.55	3.8	0.27	-

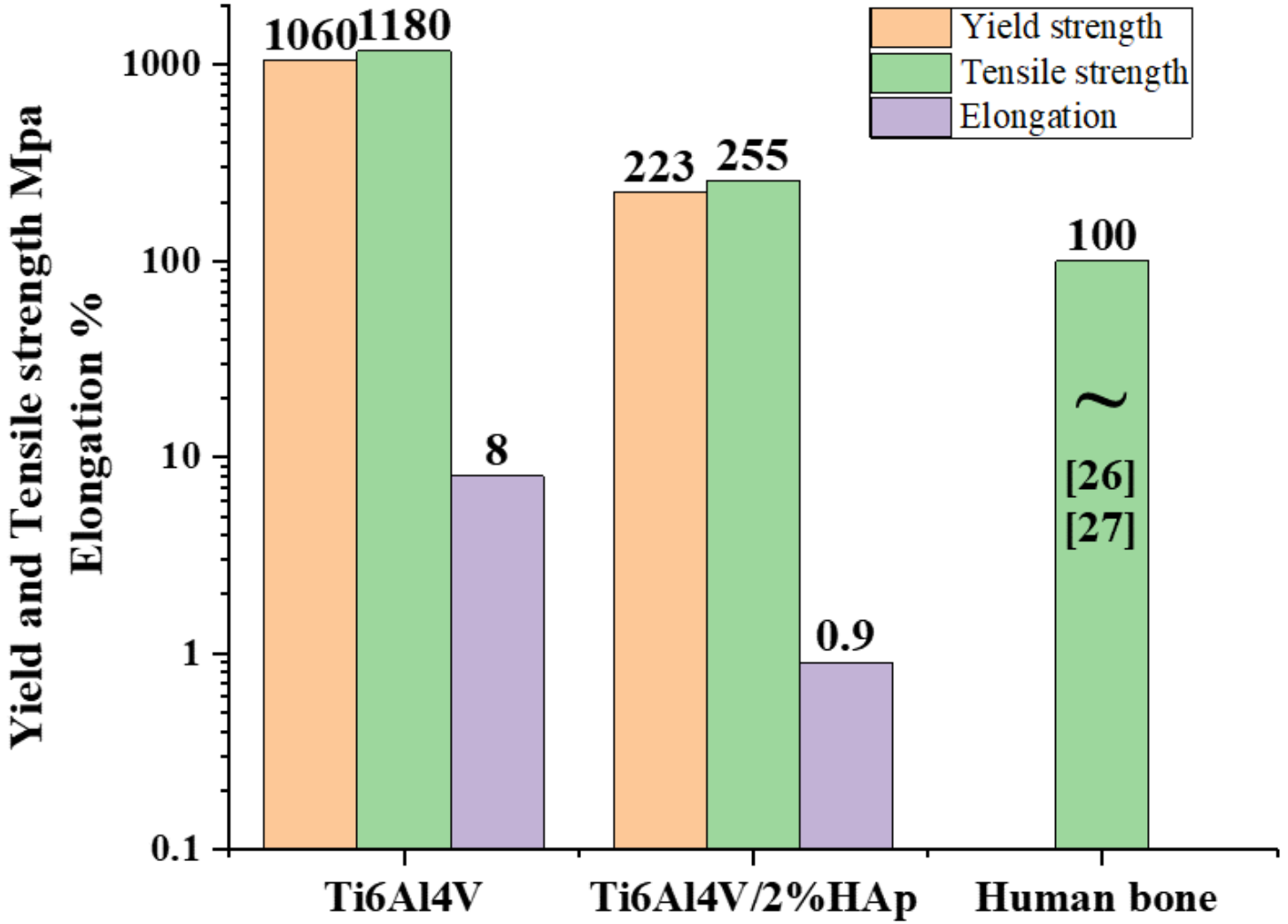
Results and Discussion

Nanosized particles on the microstructure of the SLM Ti64-2%HA composites.



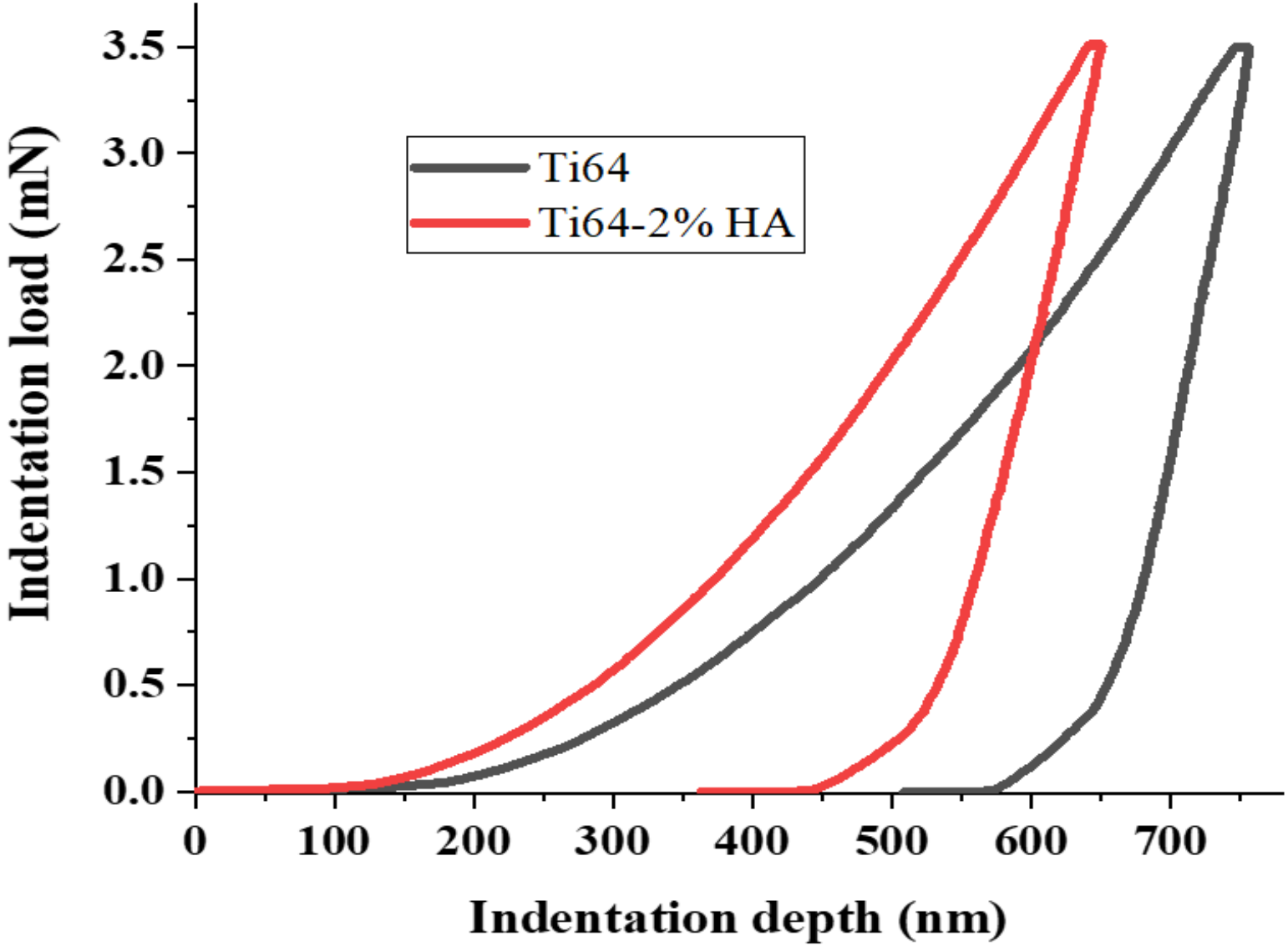
Results and Discussion

Tensile properties of the SLM Ti64 and Ti64-2%HA composites.



Results and Discussion

Load/nano-indentation depth curves of the SLM Ti64 and Ti64-2%HA composites.



Next Work

Heat treatment of selective laser melted Ti6Al4V alloy: microstructure and mechanical properties

Thank you very much for your attention