



Contribution ID: 108

Type: Oral Presentation

## Hydrogenation of Ti6Al4V alloy and Commercially Pure (CP) Ti

Tuesday, 30 June 2015 14:00 (20 minutes)

**Abstract content** **<br> &nbsp;** (Max 300 words) **<br>** **<a href="http://events.saip.org.za/getFile.py/?target="\_blank">Formatting &<br>Special chars</a>**

Hydrogen is considered as an ideal energy carrier for future, it is one of the most abundant elements on earth. Hydrogen storage in metal hydrides is of research interest because metal hydrides often have high hydrogen energy density and safe as compared to liquid hydrogen and hydrogen gas [1]. Recently, an increase in understanding of titanium metallurgy has demonstrated that introduction of hydrogen as a temporary alloying element improves manufacturing, changes the micro structure [2]. Titanium and its alloys are considered as potential hydrogen storage material because they have high hydrogen affinity. In this work CP-Ti and Ti6Al4V alloy were hydrogenated at different temperatures using vacuum furnace at atmospheric pressure. Elastic recoil detection analysis was used to determine the concentration and depth profiling of hydrogen. X-rays diffraction technique (XRD) was used for phase analysis. Optical microscope was used investigate the effect of hydrogen on the microstructure of Ti and Ti6Al4V alloy. It was observed from XRD analysis that Titanium hydrides were formed from temperatures of 550°C. Concentration of hydrogen obtained by elastic recoil detection analysis shows that absorption of hydrogen increases with increasing temperature.

### References

1. I.P. Jain, Y.K. Vijay, L.K. Malhotra and K.S. Uppadhyay.,13 (1988) 15-23.
2. B. G. Yuan, H. P. Yu, C. F. Li, D. L. Sun; Int J of Hydrogen Energy.,35 (2010) 1829-1838.

**Apply to be<br> considered for a student <br> &nbsp;** **award (Yes / No)?**

Yes

**Level for award<br>&nbsp;**(Hons, MSc, **<br> &nbsp;** PhD, N/A)?

MSc

**Main supervisor (name and email)<br>and his / her institution**

Dr Miroslava Topic mtopic@tlabs.ac.za, iThemba LABS,

**Would you like to <br> submit a short paper <br> for the Conference <br> Proceedings (Yes / No)?**

Yes

**Please indicate whether<br>this abstract may be<br>published online<br>(Yes / No)**

Yes

**Primary author:** Ms MAZWI, Sive (University of the Western Cape/ iThemba LABS)

**Presenter:** Ms MAZWI, Sive (University of the Western Cape/ iThemba LABS)

**Session Classification:** DPCMM

**Track Classification:** Track A - Division for Physics of Condensed Matter and Materials