

## Study of First Hydrogenation Kinetics at Different Temperatures of BCC Alloy 52Ti-12V-36Cr + x wt% Zr (x = 4, 8 & 12)

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**Abstract :** The effects of Zr addition on kinetics and hydrogen absorption characteristics of BCC alloy 52Ti-12V-36Cr doped with x wt% of Zr (x = 0, 4, 8 & 12) was investigated. The samples have been characterized by X-ray diffraction, and activation study were made at four different temperatures- 100 oC, 200 oC, 300 oC and 400 oC. First hydrogenation kinetics of alloys were studied at 20 bar of hydrogen pressure and room temperature after giving heat treatment at different temperatures for 6 hours. Among the various Zr doped alloys studied, the composition 52Ti-12V-36Cr + 4wt% Zr shows maximum hydrogen storage capacity of 3.6wt%. Small amount of Zr shows advantageous effects on kinetics of alloy. It was also found out that alloys with the higher Zr concentration can be activated by giving heat treatment at lower temperatures. There is reduction in hydrogen storage capacity with increasing Zr content in the alloy primarily due to increasing abundance of secondary phase as established by X-Ray Diffraction and Scanning Electron Microscope results.

**Keywords :** hydrogen storage, metal hydrides, bcc alloy, heat treatment

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