

## **Effect of Nb, Zr, V, Ni, Cr incorporation on the microstructure, kinetics and hydrogen storage capacity of an AB-type TiFe alloy.**

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### **Abstract**

In this study, the effect of structural modification of an AB-type TiFe alloy with Nb, Zr, V, Ni and Cr on the hydrogen storage capacity and kinetics at room temperature (RT) was evaluated. The alloys were obtained by vacuum induction melting. Microstructural and morphological evaluation was performed by X-ray diffraction (XRD) and field emission scanning electron microscopy. In addition, the chemical composition was evaluated by energy dispersive X-ray spectroscopy. Hydrogenation and dehydrogenation tests of the samples were performed in a Sieverts type apparatus, evaluating the kinetics of hydrogen absorption and desorption, reversibility through cycling tests, and pressure and composition isotherms. The hydrided samples were analyzed by differential scanning calorimetry and XRD. Reversible hydrogen storage capacities > 1 wt. % were obtained in the alloys, also finding that the elements Nb, Zr, V, Ni and Cr promote the activation process (first hydrogen absorption) in the TiFe alloy.

**Keywords:** AB-type alloy, hydrogen storage, structure.