

Hydriding Characteristics of FeTi-Based Ti-Fe-V-Mn Alloy*

By S. V. Mitrokhin, V. N. Verbetsky

Chemistry Department, Lomonosov Moscow State University, Moscow, 119899, Russia

Hong Cunmao and Zhang Yufen

Chemistry Department, Peking University, Beijing, 100878, P. R. China

TiFe-based alloy / Hydrogen absorption / P-C-isotherms / Surface composition

The hydrogen absorption characteristics of the FeTi-based alloy $Ti_{0.457}Fe_{0.447}V_{0.048}Mn_{0.048}$ were studied by means of X-ray diffraction, EDS and AES. The alloys' resistance to contamination with oxygen and water vapor was determined. Addition of 5 at.% of manganese and vanadium does not change the absorption capacity but gives rise to a new phenomenon of dissociation plateau pressure values "smoothing" so that the isotherms exhibit no distinct region of monohydride existence. It was found that upon hydriding the surface composition changes greatly. The added alloying metals prevent the iron atoms from oxidation and play a catalytic rôle in the hydrogenation process.

1. Introduction

The effect of alloying FeTi with manganese on the hydriding characteristics of this compound has been investigated in previous work [1, 2]. In our recent work [3] we reported on some features of the hydriding behavior of a FeTi-based alloy in the Ti-Fe-V system which absorbed as much as 1 H/M and the desorption isotherms exhibited only one pressure plateau.

Now we report on the hydriding characteristics of the alloy $Ti_{0.457}Fe_{0.447}V_{0.048}Mn_{0.048}$.

2. Experimental

The alloy $Ti_{0.457}Fe_{0.447}V_{0.048}Mn_{0.048}$ was prepared by melting the component metals (purity higher than 99.9%) in an argon-arc furnace. The

* Presented at the International Symposium on Metal-Hydrogen Systems, Fundamentals and Applications, Uppsala, Sweden, June 8–12, 1992.