

Improvement of first hydrogenation of TiFe alloy by adding ZrMn₂

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In this paper, we report the microstructure and hydrogen storage properties of TiFe + x wt.%ZrB₂ where (x=2, 4, 8, 12) and A = Mn or V. All alloys were prepared by arc melting and used without any heat treatment. Each alloy was made of two phases: a TiFe phase with very small amount of zirconium or vanadium, and a second phase which has a higher proportion of zirconium. We found that, for both types of alloys, the first hydrogenation time decreases as X increases. Faster hydrogenation and higher capacities were shown by the alloys casted with ZrV₂. Pressure-composition isotherms also show that, for ZrMn₂ containing alloys, increasing x decreases the absorption plateau pressure. Moreover, for 1wt.%ZrMn₂, air exposure had a minimal impact on hydrogen absorption behaviour. Finally we found that cold rolling can effectively improve the activation kinetics of TiFe+x wt.%ZrMn₂ (x=4 and 8) alloys.