

Nanocomposites and nanomaterials

Study of Ti, V and their oxides based thin films after a hydrogen charging

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We are interested in the hydrogen storage ability and the effect of hydrogen sorption on the crystal and electronic structure and physical properties of Ti, V and their oxides-based thin films [1].

Thin films consisted of Ti, TiO₂ and VO_x layers have been deposited by means of magnetron dc pulse sputtering system. The film characteristic was determined by combined analysis of X-ray diffraction, X-ray reflectometry, and Rutherford backscattering. The hydrogen depth profile upon hydrogen charging at 1 bar and/or hydrogenation at pressure up to 102 bar was determined by using secondary ion mass spectrometry and nuclear reaction analysis using a N-15 beam.

Our analysis indicates that a large hydrogen absorption can be obtained in the thin films of VO_x-TiO₂ system [2].

1. Z. Tarnawski, K. Zakrzewska, N.-T. H. Kim-Ngan, M. Krupska, S. Sowa, K. Drogowska, L. Havela, A.G. Balogh, Acta Physica Polonica A, vol.128, p. 431-439 (2015)
2. Z. Tarnawski, K. Zakrzewska, N.-T. H. Kim-Ngan, M. Krupska, S. Sowa, K. Drogowska, L. Havela and A. G. Balogh, Advances in Natural Science: Nanoscience and nanotechnology, vol. 6, p. 013002 (2015)