

s12.m34.p1 **Discrete Stochastic Structure Evolution in Pd-Mo and Pd-Ta Alloys after Hydrogenation.** Anishchenko A.A., Avdyukhina V.M., Katsnelson A.A., Revkevich G.P., *Lomonosov Moscow State University, Physical Faculty, Moscow, Russia. E-mail: andrey@eteam.ru*

**Keywords: Discrete evolution; Multi-valley structure of thermodynamical potential; Hydrogen**

The nonmonotonous structure evolution was determined in Pd-Mo and Pd-Ta alloys [1,2] after hydrogenation. Hydrogen and induced vacancies cause the thermodynamic instability of the system after hydrogenation. The main peculiarities of the displayed effect are the multiphase decomposition caused by the hydrogenation, and the frequentative transformation of the system from multiphase to monophasic and backwards. For explanation the first of these effects was proposed [2] that the distribution of thermodynamic potential in reciprocal space is multi-valley structure. For verification of this theory the Pd-Ta alloy was hydrogenated several times and while relaxation (up to 500 h) after each charging the precision investigation of diffraction maxima form were provided. Each diffraction maximum was expanded to several components and the dependence of their coordinates from angle of diffraction and time after hydrogenation was determined. As a result it was established that the first of these dependences was discrete, and the second was stochastic. The similar data was determined during relaxation after each hydrogenation. This means that the discrete stochastic structure evolution was found. The discrete character of the evolution in the system like a multiphase decomposition may be explained by the multi-valley structure of thermodynamic potential. The stochastic character of displayed processes is a consequence of the fluctuation character of hydrogen and vacancies cooperative transferences during relaxation [3].

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s12.m34.p2 **Synthesis, Structure and Oxygen Stoichiometry of a New Family  $\text{NdSrNi}_{1-x}\text{Cu}_x\text{O}_{4-\delta}$   $0 \leq x \leq 1$ .** Hanen Chaker<sup>a</sup>, Rached Ben Hassen<sup>a</sup>, Thierry Roisnel<sup>b</sup> Michel Potel<sup>b</sup> and Thierry Bataille<sup>b</sup>, <sup>a</sup>Laboratoire de Chimie des Matériaux, Faculté des Sciences de Sfax B.P. 802 - 3018 Sfax, Tunisie, <sup>b</sup> Laboratoire de Chimie du Solide et Inorganique Moléculaire, Institut de Chimie, Université de Rennes, Avenue du Général Leclerc - 35042 Rennes Cedex, France. E-mail: rached.benhassen@fss.rnu.tn

**Keywords: X-Ray powder diffraction;  $\text{K}_2\text{NiF}_4$  structure type; Rietveld refinement**

A novel series described by the formula  $\text{NdSrNi}_{1-x}\text{Cu}_x\text{O}_{4-\delta}$  for various values of x ranging from 0 to 1 were synthesized in 1 atm of  $\text{O}_2$  gas flow using conventional solid state methods and were characterized by means powder X-ray diffraction and thermogravimetric analyser. The compounds have been shown to adopt the  $\text{K}_2\text{NiF}_4$  structure (space group  $I4/mmm$ ). The stability of the  $\text{K}_2\text{NiF}_4$  type structure was deduced from the tolerance factor considerations. The structures have been refined from X-ray powder diffraction data using the Rietveld method. Variation of the a and c parameters shows a complex behaviour with increasing copper content. The oxygen content of the compounds was determined from thermogravimetric analyser (TGA).

The structure of  $\text{NdSrNi}_{1-x}\text{Cu}_x\text{O}_{4-\delta}$  can be described as an ordered intergrowth of alternating perovskite ( $\text{Nd/Sr Ni/Cu O}_3$ ) and rock salt ( $\text{Nd/Sr O}$ ) layers stacked along the tetragonal c-axis. The  $(\text{Ni/Cu})\text{O}_6$  octahedra share corners in the **ab** plane forming a two-dimensional array of  $(\text{Ni/Cu})\text{-O-(Ni/Cu)}$  bonds which is responsible for a variety of interesting physical phenomena.