Nanostructured surfaces

Indicatory surface of inelasticity-elasticity characteristics of alloys and automated system of visualization of anisotropy

A.P. Onanko, M.P. Kulish, G.T. Prodayvoda, Y.A. Onanko, A.V. Shabatura, A.N. Onischenko, A.N. Rozhkovskiy

Taras Shevchenko Kyiv national university, Volodymyrs'ka str., 64, Kyiv, 01601, Ukraine.

E-mail: onanko@univ.kiev.ua

The temperature dependence internal friction (IF) $Q^{-1}(T)$ and elastic module E(T) (directional surface of inelastic-elastic body) of Ti_3Al after cutting, polishing and atomic force microscopy (AFM) microstructure is represented on fig. 1.

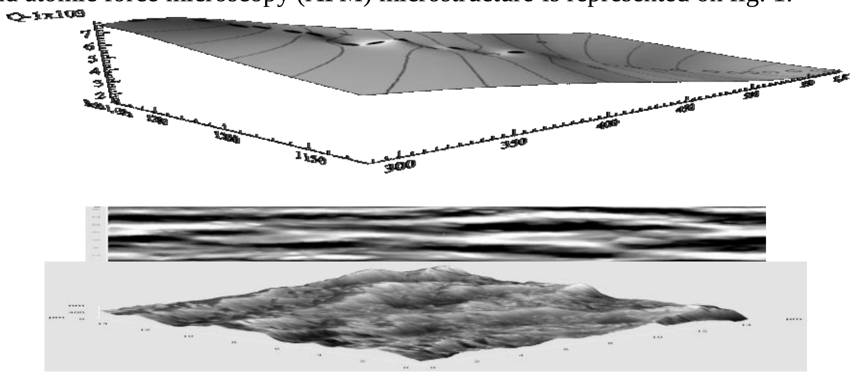

Fig.1. Temperature dependence of internal friction $Q^{-1}(T)$ and elasticity module E(T) (indicatory surface of inelasticity-elasticity body) Ti_3Al alloy after mechanical treatment and microstructure (AFM 3D, 15x15 мкм).

There was the maximum IF Q^{-1}_{M1} in Ti_3Al at $T_{M1} \approx 400$ K with activation energy $H_1 = 0,77 \pm 0,1$ eV, time relaxation constant of this maximum IF $\tau_{01} \approx 1,9 \cdot 10^{-14}$ sec, relaxation frequency factor $f_{01} \approx 5,3 \cdot 10^{13}$ Hz, probably conditioned by the relaxation mechanism caused by reorientation interstitial hydrogen H - H atoms in dumbbell configurations at the ultrasonic alternative deformation ε [1].

Thus, the growth of IF maximums Q^{-1}_M heights testifies the increasing of structural defects concentration, and the spread of IF maximums ΔQ^{-1}_M here represents the relaxation process of structural defects new types.

1. *Onanko A.P.* Influence of hydrogen on directional surface of inelastic-elastic body $Ti_{0.5}Al_{0.5}$ alloy // Metalphysics and new technology. – 2011. - **33**, № 2. – P. 253 – 261.