INFLUENCE OF COADSORBED STRONTIUM ATOMS ON SURFACE DIFFUSION IN LITHIUM SUBMONOLAYER FILMS ON TUNGSTEN (112) FACE

A.T. Loburets[1], *S.A. Zaika*[1], *A.G. Naumovets*[2]

[1]Yu. Kondratyuk Poltava National Technical University
(24, Pershotravnevyi Ave., Poltava 36011, Ukraine; e-mail: anatollob@gmail.com)
[2]Institute of Physics, Nat. Acad. of Sci. of Ukraine
(46, Nauka Ave., Kyiv 03680, Ukraine)

S u m m a r y

The surface diffusion of lithium atoms in coadsorbed Li–Sr submonolayers on the atomically anisotropic tungsten (112) face is studied, by using the method of scanning contact-potential microscopy. The influence of strongly bound and less mobile Sr adatoms on the diffusion kinetics of more mobile Li atoms is analyzed. Coadsorbed strontium atoms are found to strongly suppress the diffusion of lithium ones. The concentration dependences are obtained for the chemical diffusion coefficients, activation energy, and pre-exponential factor in the Arrhenius equation. Possible mechanisms of surface diffusion in coadsorbed films are considered, by taking the nature of the lateral interaction between adatoms into account, which is responsible for the formation of long-period chain structures. A conclusion is drawn that the collective mechanisms of diffusion, which give rise to the exponential growth of diffusion coefficients, become active as the lithium coverage degree increases so that the film becomes structurally incommensurate with the substrate. The results obtained can be applied to the development of technologies for the modification of physico-chemical properties of surfaces.