

Jordan Georgiev, Stoyko Gyurov and Nikola Stanev. DETERMINATION OF THE
HYDROGEN DIFFUSIVITY IN $\text{Al}_9\text{Si}_3\text{CuTi}$ ALLOYS

The hydrogen transport in the $\text{Al}_9\text{Si}_3\text{Cu}(0,2-4,1)\text{Ti}$ alloys with different content of Ti (0,2; 1,02; 2,3 and 4.1 wt.%) is studied by using of permeation method. The measured flux is obtained as a result of interaction between the specimen (as a cathode) and hydrogen glow discharge with current density 12 mA/cm^2 , voltage 500 V, constant hydrogen pressure 1330 Pa, distance between electrodes 24 mm in 640–780 K temperature range. Solution of the second Fick's equation in case of uni-dimensional diffusion problem describing the diffusion through a thin plate (membrane) is used to determine the hydrogen diffusivity in studied alloys. The solution describes case when the rate of surface processes is comparable to the diffusion. Values of diffusivity D were presented in Arrhenius plot and worked out by the least-squares method and both preexponential factors and activation energies were obtained.

Keywords: diffusion, hydrogen, glow discharge, aluminium alloy

PACS number: 66.30J