

FEATURES OF THE TEMPERATURE DEPENDENCE OF MICROHARDNESS IN HIGH-ENTROPY ALLOYS CoCrFeNiMnV_x ($x = 0-2$)

H. V. Rusakova¹, L. S. Fomenko¹, S. V. Lubenets¹, E. D. Tabachnikova¹, M. A. Tikhonovsky², I. P. Kislyak²

¹B.Verkin Institute for Low Temperature Physics and Engineering of NAS of Ukraine, 47 Nauky Ave., Kharkiv, 61103, Ukraine

²National Science Center “Kharkiv Institute of Physics and Technology” of NAS of Ukraine, 1 Akademichna Str., Kharkiv, 61108, Ukraine
e-mail: rusakova@ilt.kharkov.ua

Phase composition of studied alloys CoCrFeNiMnV_x and deformation mechanisms in the range 77-293 K

N	X	Composition	Deformation mechanism
1	0-0.4	single FCC phase	thermally activated 77-293 K
2	0.5-1	two-phase	athermal deformation
3	1.25-2	single tetragonal sigma phase	thermally activated 77-293 K

Summary. At all studied temperatures, the microhardness depended weakly on the vanadium content at small and large values of x ($x = 0-0.4$ and $x = 1.25-2$). A sharp increase in microhardness at 293 K and 77 K, starting from $x \sim 0.5$, is associated with the formation of a large amount (≥ 20 volume %) [1] of hard intermetallic sigma phase with a tetragonal lattice.

[1] D. Stepanov, D.G. Shaysultanov, G.A. Salishchev, M.A. Tikhonovsky, E.E. Oleynik, A.S. Tortika, O.N. Senkov, Effect of V content on microstructure and mechanical properties of the CoCrFeMnNiV_x high entropy alloys, J. Alloys Comp. 628 (2015) 170-185

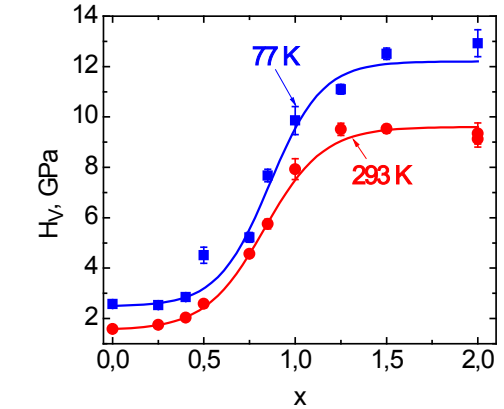
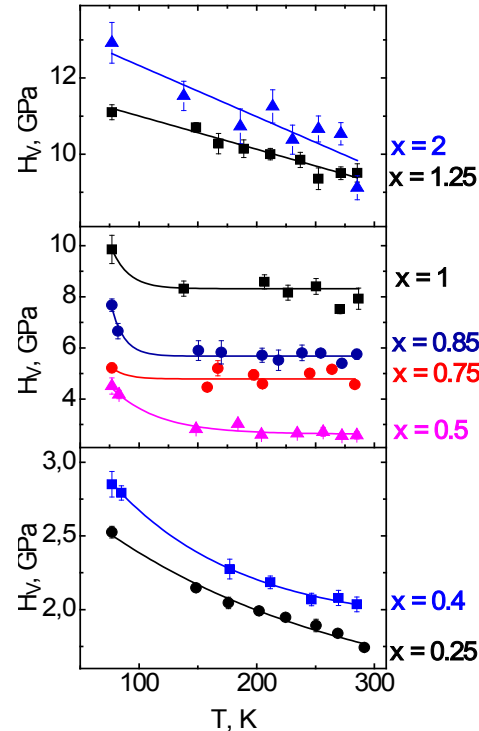


Fig. 2. The vanadium content dependences of microhardness of CoCrFeNiMnV_x ($x=0-2$) alloys at 77 K and 293 K.

Fig. 1. Temperature dependences of microhardness of CoCrFeNiMnV_x alloys.