Influence of nanostructured state on properties of high-entropy CrMnFeCoNi2 alloy.

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High-entropy alloys are a new class of materials with unique physical and mechanical properties. With an optimal choice of elements, it is possible to obtain alloys with the required combination of specific gravity, melting point, ductility and strength. Table 1 shows alloys with record strength and ductility in the temperature range from 20 to 1673 K.

	CoCrFeNMo	TiZrNbTaHf	NiCoFeAlTiNb MoW	NbCrMoVTa
T K	4,2	293	1073	1673
ρ, g/cm^3	8,7	9.2	7,2	11,5
$\sigma_{в,}$MPa	1650	1420	1050	450
δ, %	38	22	25	32

In this work, for the purposes of diffusion welding of heat-resistant alloys, a high-entropy alloy with a melting point and specific gravity is developed close to that of heat-resistant alloys. The advantage of this high-entropy alloy is that, having high strength values, it allows deformation by rolling in air without intermediate annealing. This makes it possible to obtain foil with a thickness of up to 70 microns, which is necessary for diffusion welding and friction welding.

In fig. 1 shows the properties of the developed high-entropy alloy CrMnFeCoNi2 depending on the structural state and test temperatures.

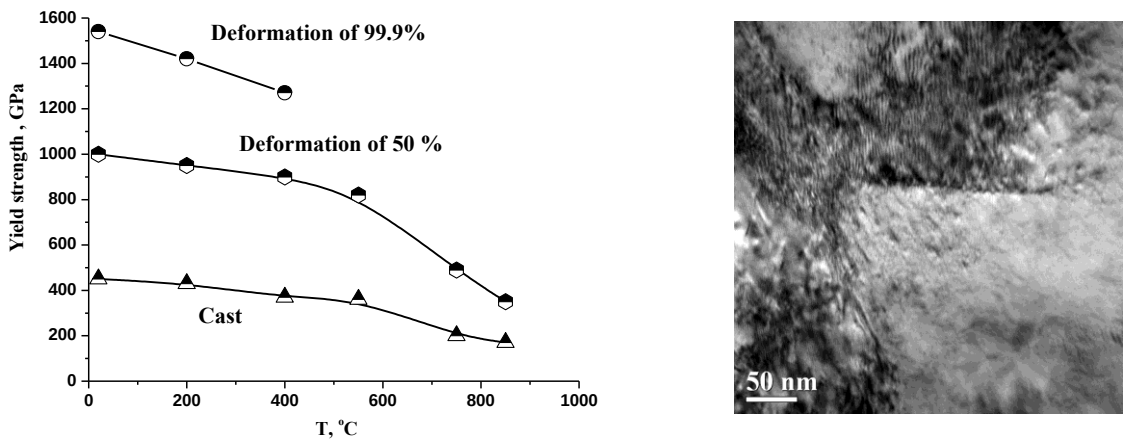

Fig. 1. Yield strength (a) and structure (b) of high-entropy alloy CrMnFeCoNi2 depending on the structural state of the material and the test temperature