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**FORMATION OF THE GRAIN STRUCTURE OF THE INTERMETALLIC COMPOUND
Ni₃Al IN THE NONEQUILIBRIUM CONDITIONS OF THE INTERACTION OF THE
INITIAL ELEMENTS**

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Investigation of preload influence on powder mixture 3Ni+Al and plastic deformation of high temperature synthesis product in a unified cycle of process of volume exothermic reaction of intermetallic compound formation under pressure on grain size in synthesized intermetallic compound Ni₃Al and its strength properties were carried out. It is shown that in the process of high-temperature synthesis under pressure in a synthesized Ni₃Al intermetallic compound an irregular in size grain-size structure is formed - the grain size increase from the upper surface of the synthesized sample to the central part of the cross section, with following decrease to the lower surface. With the increase in the value of the preliminary pressure on the initial powder mixture, the average grain size in the bulk of the synthesized intermetallic sample decreases, on retention of general distribution of the disparate grains in the volume of the synthesized samples. Highest effect of grain size reducing in the intermetallic compound synthesized under pressure is observed when the compacting process is combined in a mold-reactor with a partial extrusion of the high-temperature synthesis product. The decreasing of the grain size has a significant effect on the strength and plasticity of the intermetallic compound Ni₃Al - the strength and plasticity of the Ni₃Al intermetallic compound increase with decreasing grain size.