

The Synthesis of NiAl Using the Pulse Plasma Method with the Participation of the SHS Reaction

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NiAl sinters were produced of nickel and aluminium powders using the pulse plasma sintering method at a load of 30 MPa and a process time of 900 s. The hardness of the sintered materials was 420 HV (under a load of 1 kg) and the density was 6.0 g/cm³. The structure, phase composition, and chemical composition of the sinters were examined at various stages of the process. It appears that NiAl synthesis proceeds in two steps. During the initial step, when the temperature is maintained at 910K, the melted aluminium and solid nickel react to form the NiAl₃ and Ni₂Al₃ phases. During the next step, carried out at a temperature of 1420 K, we observe the formation of the NiAl phase.