

Development of Forced SHS Compaction to Produce a Construction Alloy with Improved Mechanical Properties in the Ti–C–Ni–Mo System

V.L. Kvanin¹, N.T. Balikhina¹, I.P. Borovinskaya¹, Li Shujun², and Gao Di²

¹ *Institute of Structural Macrokinetics and Materials Science, Russian Academy of Sciences (ISMAN), Chernogolovka, 142 432 Russia*

² *Shandong Nonmetallic Materials Institute, Shandong, China*

The method of forced SHS compaction of finely dispersed hard alloys with an elevated content of the carbide phase was proposed. The method was used to synthesize hard alloy in the Ti–C–Ni–Mo system. The resultant alloy exhibited higher than typical mechanical properties for the given class of materials (its hardness is higher than 90 HRA and bending strength limit is above 1300 MPa). The alloy structure and the mechanism of its destruction were studied. The experiments showed that the material was mainly deformed via a trans-crystallite scheme, and the grains of up to 0.3–2.0 μm in size strongly adhered to a metallic substrate, thus, providing a high value of the bending strength limit. The possibility of synthesis of highly strong alloys from both the domestic and imported (Chinese) raw materials was demonstrated.