

Abstract Submitted
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Shock-Wave Synthesis and HTHP Sintering of Cubic Silicon Nitride¹ A. YUNOSHEV, Lavrentyev Institute of Hydrodynamics, Lavrentyev Prospect 15, 630090 Novosibirsk, Russia, V. SIL'VESTROV, Lavrentyev Institute of Hydrodynamics, YU PALYANOV, Institute of Mineralogy and Petrography, Koptjug Prospect 3, 630090 Novosibirsk, Russia, A. KALININ, Institute of Mineralogy and Petrography — The shock synthesis of cubic silicon nitride ($c\text{-Si}_3\text{N}_4$) was realized in a flat recovery container. Initial samples were pressed mix of $\beta\text{-Si}_3\text{N}_4$ and copper powders. At fraction of copper more than 60 vol. % and shock pressure about 53 GPa in ampoule cover the yield of a high-pressure phase reaches 95-100 %. About compaction or sintering of $c\text{-Si}_3\text{N}_4$ powder to bulk it is not known. The explosive compaction and static HTHP sintering at pressure 5-6 GPa and temperature 1100°C were used to form the bulks from this nano-dispersive material. The bulks up to 6-8 mm in size were obtained. Vickers hardness of the bulks reaches $HV=31$ GPa at indentation force of 200 g, that is more than hardness for cubic silicon nitride bulks obtained in diamond anvils by the other researchers (Tanaka, et al., 2002).

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