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The influence of high temperature shock compression conditions on transformation degree of silicon nitride to cubic phase¹ VLADISLAV YAKUSHEV, ANDREY ZHUKOV, ALEXANDER UTKIN, ALEXANDRA ROGACHEVA, Institute of Problems of Chemical Physics RAS — In the present work a research of silicon nitride transformation to high pressure cubic phase was performed in plane recovery ampoules using high temperature shock compression method (HTSC). The samples containing different concentrations of silicon nitride powder and high compressible temperature raising inert additive (KBr, KCl) were subjected to shock loading at 36 and 50 GPa. Similar experiments were performed with commonly used copper powder additive and without any additives for comparison. It was shown that increase of additive concentration leads to increase in transformation degree of silicon nitride to cubic phase. At 36 GPa transformation degree for KBr additive ($\leq 35\%$) is higher than for KCl additive ($\leq 22\%$) and much higher than that in experiments with copper powder additive ($\leq 9\%$). At 50 GPa transformation degree reaches 96% (KBr additive). In these experiments cubic phase was obtained in a nanocrystalline form. Cubic phase was not found in recovered silicon nitride after loading of samples which contained no additives.

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