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Recover of C₃N₄ Nanoparticles Under High-Pressure by Shock Wave LoadingYi-Gao Wang^{a,b}, Fu-Sheng Liu^{a,b,*}, Qi-Jun Liu^{a,b}, Xu-Yu Ling^{a,b}, Wen PengWang^{a,b}, Zhong Mi^{a,b}

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Abstract

Theory predicts that β -C₃N₄ with its dense structure is a superhard material. In order to synthesize this material, light-gas gun loading and shock recovery technology were used to perform experiments. The amorphous nitrogen-enriched g-C₃N₄, produced by the thermal decomposition of melamine, was used as a precursor. The shock synthesis experiment was completed under the pressure of 50 GPa. A high-density phase with a β -C₃N₄ structure was detected only in the desired product. It is suspected that the elemental composition and synthetic pressure of precursors may be the main factors affecting the phase composition of products. This has significant potential for the synthesis of pure superhard carbonitride compounds.

Key words: shock wave, synthesis, superhard material, thermal decomposition, C₃N₄, recovery.

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