

THE COMPOSITION OF CALCIUM NITRIDE OBTAINED BY THE SHS METHOD

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Calcium nitride can be used as a feedstock for the synthesis of nitrides, as an additive for the purification of steel, and as a catalyst for converting hexagonal boron nitride to cubic boron nitride [1, 2]. Typically, Ca_3N_2 is produced by direct reaction of an alkaline earth metal with dry nitrogen gas. A Bowman et al synthesized Ca_3N_2 in an argon-filled glove box a piece of calcium metal (~8–12 g, cut from an ingot) was filed clean, placed inside a stainless steel crucible and heated under N_2 (ca. 2 atm) within a closed steel vessel for 24 h at 1023 K [3]. The SHS method allows you to obtain calcium nitride in a few seconds, since the combustion reaction is used for synthesis. We have previously shown that the main phase in the synthesis product is $\alpha\text{-Ca}_3\text{N}_2$ (Ia), but when interacting with atmospheric air, Ca_3N_2 turns into $\text{Ca}(\text{OH})_2$ [4].

It can be expected that in the process of interaction with atmospheric moisture, not only calcium hydroxide is formed, but also other hydrated products. The purpose of this work is a more detailed study of the phase composition of the products formed during the grinding of calcium nitride obtained by the SHS method. The composition of the crushed products was studied by powder X-ray diffraction (PXD). Origin software was used to separate individual reflexes in the XPD patterns.

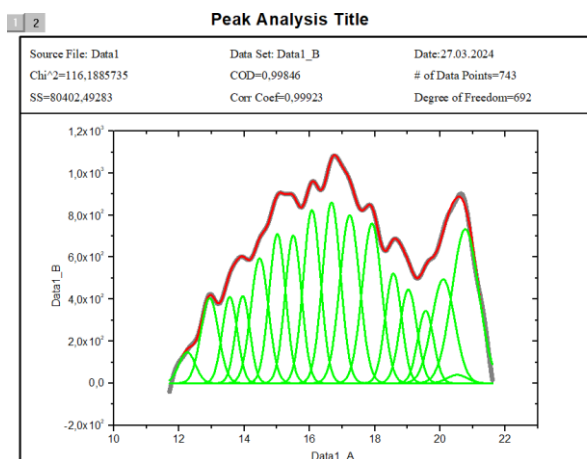


Fig. 1. An example of reflexes separation in XPD patterns.

The results obtained showed that the crushed product may contain hydrated calcium nitrites and calcium nitrates.

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