Rietveld Refinement of the Crystal Structure of $\alpha$-Be$_3$N$_2$ and the Experimental Determination of Optical Band Gaps for Mg$_3$N$_2$, Ca$_3$N$_2$ and CaMg$_2$N$_2$

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$\alpha$-Be$_3$N$_2$ powder was obtained by reacting Be metal with dry, flowing N$_2$ at 1600 K. The product contained 5.9(7) wt.% of BeO. The anti-bixbyite structure suggested earlier was verified through Rietveld refinement on the basis of X-ray powder data ($Ia\bar{3}$ (#206); $a = 814.518(6)$ pm). The optical band gaps of $\alpha$-Be$_3$N$_2$, Mg$_3$N$_2$ and Ca$_3$N$_2$ are compared with newly measured values for Mg$_3$N$_2$, Ca$_3$N$_2$ and CaMg$_2$N$_2$.

*Key words:* Beryllium Nitride, Optical Band Gap, Rietveld Refinement, Structure Elucidation