

Transformation mechanism of the sodalite-to-cancrinite phase transformation in oxalate-bearing solution

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Cancrinite, $\text{Ca}_6\text{Ca}_2(\text{AlSiO}_4)_6(\text{CO}_3)_2(\text{H}_2\text{O})_2$, is one of feldspathoid minerals occurring in alkaline rocks. The crystal structure of cancrinite consists of three-dimensional aluminosilicate framework in which various cations (e.g., Na^+ , K^+ , Ca^{2+}) and anions (e.g., CO_3^{2-} , Cl^- , OH^- , SO_4^{2-} , NO_3^- , $\text{C}_2\text{O}_4^{2-}$) are occluded. Recently, Chukanov et al. (2010) reported a new cancrinite group mineral, kyanoxalite $[\text{Na}_7(\text{AlSiO}_4)_6(\text{C}_2\text{O}_4)_{0.5-1.0}(\text{H}_2\text{O})_5]$, from the Khibiny-Lovozero Alkaline Complex, Kola Peninsula, Russia. The authors mentioned that kyanoxalite was formed by hydrothermal alteration of sodalite $[\text{Na}_4(\text{AlSiO}_4)_3\text{Cl}]$, however, experimental evidence of the transformation of sodalite into cancrinite was not provided. In this study, we synthesize oxalate-bearing cancrinite and discuss the formation mechanism.

Keywords: Cancrinite, Sodalite, Oxalate