

High-Temperature X-ray Study of Zn-substituted $\text{Cu}_2\text{V}_2\text{O}_7$

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A room temperature X-ray study has been performed on the Zn-substituted $\beta\text{-Cu}_2\text{V}_2\text{O}_7$ [1, 2], however no study of the $\text{Cu}_2\text{V}_2\text{O}_7$ - $\text{Zn}_2\text{V}_2\text{O}_7$ solid solutions has been yet done under high temperature *in situ*. Such studies are important as there are two known polymorphs of $\text{Zn}_2\text{V}_2\text{O}_7$ and three polymorphs of $\text{Cu}_2\text{V}_2\text{O}_7$, both high-temperature modifications ($\beta'\text{-Zn}_2\text{V}_2\text{O}_7$ [3] and $\beta'\text{-Cu}_2\text{V}_2\text{O}_7$ [4]) are not retained on quenching at a practicable rate.

High-temperature X-ray analysis of the $\text{Cu}_{2-x}\text{Zn}_x\text{V}_2\text{O}_7$ solid solutions ($0 \leq x \leq 0.7$) was carried out in the temperature range of 25°-770°C *in situ*. With substitution of Cu by Zn temperatures of the $\alpha \rightarrow \beta'$ and $\beta \rightarrow \beta'$ phase transitions decreased, and both phase transitions changed their features and character in comparison with pure $\text{Cu}_2\text{V}_2\text{O}_7$.

As the main difference between the $\beta'\text{-Cu}_2\text{V}_2\text{O}_7$ and $\beta\text{-Cu}_2\text{V}_2\text{O}_7$ structures involves the V-O-V angle in the $[\text{V}_2\text{O}_7]^{4-}$ groups decreasing sharply upon quenching, a concentration dependence of structural parameters for both Zn-substituted structures was established and probable cause for the $\beta' \leftrightarrow \beta$ phase transition was given.

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