

Effect of Li_2O_3 Addition on the Preparation of $(\text{Y}_{2-y}\text{Li}_y)\text{Ti}_2\text{O}_{7-y}$

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A new series of $(\text{Y}_{2-y}\text{Li}_y)\text{Ti}_2\text{O}_{7-y}$ having an ordered pyrochlore phase was prepared by a solid state reaction method with a solid solution range of $0.05 \leq y \leq 0.10$. Unit cell parameters obtained by the Rietveld refinement method shows that the a -axis decreases linearly with increasing the amount of Li ion addition, indicating the successful incorporation of the Li ion into unit cell. The average x -fractional coordinate of the O(1) site depends

on the ionic radius ratio of $r(\text{A}^{3+})/r(\text{Ti}^{4+})$ in the $\text{A}_2\text{Ti}_2\text{O}_7$ with a pyrochlore phase. The Ti K -edge XANES spectra of the $(\text{Y}_{2-y}\text{Li}_y)\text{Ti}_2\text{O}_{7-y}$ show that the valence of the Ti ions is slightly less than 4 so that Ti is in the mixed valence state. Average particle size increases with increasing the amount of extra Li ion addition, which acts as a flux to lower the melting point of the materials.