

Effect of Li Content on the DSC and Electrical Conductivity of $(\text{Li}_{1-x}\text{K}_x)_2\text{SO}_4$ Mixed Crystals

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Differential scanning calorimetry on $(\text{Li}_{1-x}\text{K}_x)_2\text{SO}_4$ mixed crystals, where $x = 0.01, 0.1, 0.3$ and 0.5 , revealed that, as the potassium content increases, the first high temperature phase of the intermediate LiKSO_4 phase at $T = 432^\circ\text{C}$ grows and shifts to higher temperature, and a double-phase mixture consisting of LiKSO_4 and Li_2SO_4 exists for $x < 0.5$. Ionic conductivity measurements on $(\text{Li}_{1-x}\text{K}_x)_2\text{SO}_4$ mixed crystals for $x \leq 0.5$ did show that the electrical conductivity increases as the Li_2SO_4 concentration increases, with an average activation energy of 0.9 eV . The enhanced electrical conductivity is primarily a result of the increase in the Li^+ ion (charge carriers) concentration and/or the formation of a diffuse space charge layer at the interface between the two phases.

Key words: $(\text{Li}_{1-x}\text{K}_x)_2\text{SO}_4$ Crystals; DSC; Ionic Conductivity; Diffuse Space Charge Layer.