Poster Presentation

MS025.P01

Temperature induced structural phase transition in hydrated minerals $Na_6M(SO_4)_4$(M=Co,Ni)

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Minerals, in particular bimetallic sulfates, are important multifunctional materials which show properties like fast-ion conductor, ferroelectric and magnetism with variation in temperature.[1] [2] [3] These properties are generally associated with structural phase transition and hence provide a pathway for the design of futuristic materials from easily available rich mineral sources. Several new futuristic materials have been synthesized based on mineral structures. In this context, hydrated vanthoffite mineral, $Na_6Ni(SO_4)_4.2H_2O$ (DHNANI) and $Na_6Ni(SO_4)_4.4H_2O$ (THNANI), $Na_6Co(SO_4)_4.2H_2O$ (DHNACO) and $Na_6Co(SO_4)_4.4H_2O$ (THNACO) are targeted in the present work. Their thermal property followed by phase transition have been investigated. DHNANI and THNANI crystallize concomitantly having space group P-1 (Z=1) with different cell parameter so as DHNACO and THNACO and are isostructural to DHNANI and THNANI respectively. These crystals on heating above 200°C loose the water molecule and the anhydrous phase has a space group $P2_1/c$ (Z=2). The structure analyses indicate the presence of channels for Na^+ ions to migrate leading to the generation of solid electrolyte.

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Keywords: Mineral, Concomitant, Structural phase transition.