

## Poster Presentation

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### *Structural phase transitions and conducting properties in Bimetallic sulfates*

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Bimetallic sulfate minerals, hydrated as well as anhydrous are important multifunctional materials which exhibit interesting properties like fast-ion conduction, ferroelectricity and magnetism with variation in temperature [1,2,3]. These properties are generally entwined with structural phase transitions and show structural frameworks made of interconnection of octahedra and tetrahedra [1]. Bimetallic sulfates, indeed are intercalation compounds of alkali ions generated by these frameworks and they possess high ionic conductivity [1]. In the present study, anhydrous and hydrous compounds of Na<sub>6</sub>M(SO<sub>4</sub>)<sub>4</sub>, (M=Mn, Ni, Co) were synthesized to understand the structural phase transitions and its relation to fast-ion conducting properties. Na<sub>6</sub>Mn(SO<sub>4</sub>)<sub>4</sub>, is monoclinic, space group P2<sub>1</sub>/c with Z=2 and is isostructural to its Co and Ni analogues and shows high ionic conductivity and structural phase transition > 450 °C. Na<sub>6</sub>Co(SO<sub>4</sub>).2H<sub>2</sub>O, Na<sub>6</sub>Ni(SO<sub>4</sub>).2H<sub>2</sub>O are isostructural with triclinic system having space group P-1 with Z =1. In addition, structural features and correlation with ionic conductivity in Na<sub>6</sub>Co(SO<sub>4</sub>).2H<sub>2</sub>O, Na<sub>6</sub>Ni(SO<sub>4</sub>).2H<sub>2</sub>O and Na<sub>6</sub>Mn(SO<sub>4</sub>) will be outlined. These studies open up the utility of hydrated bimetallic sulfates as possible precursor for the design of functional materials.

[1] D. Swain, T.N. Guru Row, *Chem. Mater.* 2007, 19, 347-349., [2] D. Swain, T.N. Guru Row, *Inorg. Chem.* 2009, 48, 7048-7058., [3] D. Saha, G. Madras, T.N. Guru Row, *Cryst. Growth Des.* 2011, 11, 3213-3221.

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