



**STRUCTURAL AND SPECTROSCOPIC PROPERTIES OF A NEW MIXED
 $K_2Mn_{0.43}CO_{0.57}(SO_4)_2(H_2O)_6$ TUTTON SALT**

**João G. Oliveira Neto¹, Ronilson S. Santos^{1*}, Jad L. F. Simplicio¹, Marinaldo V. S. Junior¹,
Francisco N. B. Domingos¹, Otávio C. S. Neto¹, Adenilson O. Santos¹**

1 - Programa de Pós Graduação em Ciências dos Materiais - PPGCM, Universidade Federal do
Maranhão (UFMA), Imperatriz, MA, Brasil.
ronilson.santos@discente.ufma.br

ABSTRACT

In recent years, hydrated inorganic materials have been studied due to the structural, optical, and thermal properties that make them promising candidates for developing systems for storing thermal energy [1]. The class of isomorphic crystals called Tutton salts attracted attention due to the thermodynamic parameters associated with their chemical composition [2,3]. From this motivation, a new mixed Tutton salt was synthesized with composition $K_2Mn_{0.43}CO_{0.57}(SO_4)_2(H_2O)_6$ by the isothermal evaporation method after 21 days. The properties were characterized by X-ray diffraction (XRD), thermogravimetry (TG), differential thermal analysis (DTA), differential scanning calorimetry (DSC), and spectroscopic techniques. Complementarily, a computational study was conducted through Hirshfeld surfaces to identify intermolecular interactions. The XRD in single crystal results confirmed the unprecedented nature of the salt, in which the sample crystallized in a monoclinic system ($P2_1/c$). In addition, the thermal analysis revealed that the crystals have thermal stability around 90 °C. In addition, the parameters calculated from the DSC thermogram showed that the Tutton salt synthesized here presents enthalpy values and energy density promising for use in thermochemical systems. Moreover, the spectroscopic data in the emission regime showed that all salts exhibit photoluminescence in the visible region, which makes these materials interesting for application in solid-state lighting devices.

Keywords: Tutton salts; Materials Science; X-ray Diffraction..

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