

## SYNTHESIS AND STRUCTURAL CHARACTERIZATION OF THE TETRANUCLEAR IRON(III) CLUSTER WITH SALICYLIC ACID

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**Dedicated to the memory of Professor Constantin Turta on the occasion of his 80<sup>th</sup> birthday anniversary.**

**Abstract.** A new tetra-homonuclear iron(III) cluster,  $[\text{Fe}_4\text{O}_2(\text{Sal})_4(\text{H}_2\text{O})_6]\cdot 4\text{DMA}\cdot 0.75\text{H}_2\text{O}$  (where, Sal= salicylic acid and DMA= *N,N*-dimethylacetamide) consolidated *via* two  $\mu_3$ -oxo- and four salicylate-bridges was synthesized and characterized by IR spectroscopic method as well as by single-crystal X-ray diffraction analysis. The structure of the obtained tetranuclear compound consists of four  $\text{Fe}^{\text{III}}$  atoms in a “butterfly” arrangement. The compound crystallizes in the  $P2_1/c$  space group of the monoclinic system with the following unit cell parameters:  $a= 10.5350(3)$ ,  $b= 11.8840(3)$ ,  $c= 21.7830(5)$  (Å),  $\beta= 101.536(1)^\circ$ . Each  $\text{Fe}^{\text{III}}$  atom is six-coordinated in slightly distorted  $\text{O}_6$  octahedral geometry. The coordination sphere of each of the two central  $\text{Fe}^{\text{III}}$  atoms is generated by two  $\mu_3$ -oxo-bridging atoms and four oxygen atoms provided by the tridentate-bridging  $\text{Sal}^{2-}$  ligands, while the coordination polyhedron of another two iron atoms involve six oxygen atoms from three water molecules, two salicylic and one  $\mu_3$ -oxigen atom. The Fe-O distances within Fe-O-Fe bridge are of 2.102(3) Å (for wing-body) and 2.038(3) Å (for body-body).

**Keywords:** homotetranuclear salicylate, iron(III), cluster, IR spectroscopy, X-ray crystal structure.

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