

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 80th birthday anniversary.

Abstract. A new tetra-homonuclear iron(III) cluster, $[\text{Fe}_4\text{O}_2(\text{Sal})_4(\text{H}_2\text{O})_6]\cdot 4\text{DMA}\cdot 0.75\text{H}_2\text{O}$, consolidated via two μ_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 Fe^{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 iron(III) atom is six coordinated in slightly distorted O_6 octahedral geometry. Two central Fe(III) atoms are coordinated by two μ_3 -oxo-bridging atoms and four oxygen atoms provided by the tridentate-bridging Sal^{2-} ligands, while the coordination polyhedron of another two iron atoms involves three water molecules. 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.