

Exchange Interaction in a Dinuclear Iron(III) Complex of a Heptadentate Schiff Base: Synthesis, Crystal Structure and Magnetic Properties

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Synthesis, crystallographic characterization and magnetic properties of the new dinuclear iron(III) complex $\text{Fe}_2\text{L}(\text{OCH}_3)\text{Cl}_2$ ($\text{L} = 1,3\text{-bis}[\text{N}-(3,5\text{-dichloro-2-hydroxybenzylidene})\text{-2-aminoethyl}]\text{-2-(3,5-dichloro-2-hydroxyphenyl)imidazolidine}$) are reported. The structure consists of dinuclear units. The two iron(III) atoms are asymmetrically bridged by a phenoxo and a methoxo group. The iron(III) centers are separated by 3.133(2) Å. The Magnetic susceptibility of the complex was measured over the range 5 – 298 K and the observed data were successfully simulated by the equation based on the spin-Hamiltonian operator $H = -J\vec{S}_1 \cdot \vec{S}_2$. Magnetic susceptibility measurements indicate very weak antiferromagnetic coupling between the iron ions with $J = -10.8 \text{ cm}^{-1}$ and $g = 2.0$.

Key words: Dinuclear Iron(III) Complex, Super-Exchange Interactions,
Antiferromagnetic Coupling, Schiff Base, Imidazolidine