Synthesis, Crystal Structure and Magnetic Properties of an Iron(III) Pyridine-2,3,5,6-tetracarboxylate Complex

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A new pyridine-2,3,5,6-tetracarboxylato-bridged Fe(III) complex with a K\(^+\) counter ion, K[Fe(H\(_2pdtc\))\(_2\)] (I), was prepared from the reaction of Fe\(_2\)(SO\(_4\))\(_3\) \cdot 7H\(_2\)O, pyridine-2,3,5,6-tetracarboxylic acid and KOH under ambient conditions. The complex has been characterized by single-crystal and powder X-ray diffraction, IR spectroscopy, TG analysis, elemental analyses, and magnetic measurements. Through intermolecular hydrogen bonding and \(\pi\)-\(\pi\) stacking interactions, the [Fe(H\(_2pdtc\))\(_2\)]\(^-\) complex anions are assembled into supramolecular double chains with the K\(^+\) cations located between them. The variable temperature magnetic measurement has shown a weak ferromagnetic behavior over the range 300–10 K followed by antiferromagnetic behavior below 10 K.

**Key words:** Fe(III) Complex, Pyridine-2,3,5,6-tetracarboxylic Acid, Supramolecular Assembly, Magnetic Properties