

Synthesis and characterization of homoleptic iron(II) complexes with 2-aryl-imidazoles

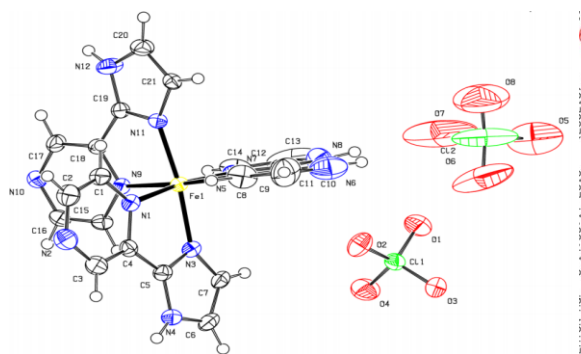
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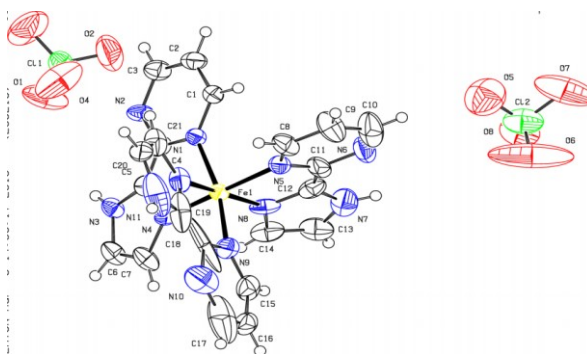
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The synthesis and characterization of coordination compounds has attracted a considerable attention due to a wide range of applications. Imidazole holds special importance because of its bifunctional ligand character, i.e., it possesses a pyrrolic and a pyridinic N-atom which by donating to the transition metals, can trigger interesting characteristics in the complexes and hence, can be manipulated for interesting applications.¹ The -NH functionality is also available for H-bonding which has an immense ability to shift the redox potential at the metal center when coordinated.²

To study the electrochemical properties and effect of basicity of the 2-aryl-imidazole ligands on the iron center for biochemical and electrochemical applications, iron(II) complexes $[\text{Fe}(\text{impz})_3](\text{ClO}_4)_2$ (**1**) and $[\text{Fe}(\text{impm})_3](\text{ClO}_4)_2$ (**2**) were synthesized and characterized using techniques like NMR, IR, UV-Vis, thermogravimetry, elemental analysis, cyclic voltammetry, conductometry and X-ray diffraction. NMR showed broad bands instead of peaks characteristic of paramagnetic complexes. UV-Vis spectra showed bands that can be assigned to MLCT and intraligand transitions for both complexes but d-d transitions could not be observed. Cyclic voltammograms reveal irreversible peak potentials at 0.78 (**1**) and 0.77 V(**2**). A complex to counter ion ratio of 1:2 was calculated using conductometric measurements. X-ray diffraction confirmed the presence of meridional isomers.



$[\text{Fe}(\text{impz})_3](\text{ClO}_4)_2$



$[\text{Fe}(\text{impm})_3](\text{ClO}_4)_2$

1. Stupka, G.; Gremaud, L.; Williams, A. F., Control of Redox Potential by Deprotonation of Coordinated 1H-imidazole in Complexes of 2-(1H-imidazol-2-yl)pyridine. *Helvetica Chimica Acta* **2005**, *88*, 487-495.
2. O'Brien, P.; Sweigart, D., Effect on redox potentials of hydrogen bonding from coordinated imidazole in metalloporphyrin complexes. *Inorganic Chemistry* **1985**, *24*, 1405-1409.

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