SYNTHESIS, CHARACTERIZATION, ELECTROCHEMICAL AND ANTIMICROBIAL STUDIES OF IRON(II) AND NICKEL(II) MACROCYCLIC COMPLEXES

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Herein, we synthesized [12] membered pyridine based transition metal macrocyclic complexes [$M^{II}LCl_2$] (M = Fe(II) and Ni(II), L = 6,12-5,11-tetraphenyl di(2-pyridyl)[b,h][1,4,7,10]-N_4[12]annulene). The synthesized macrocycles were characterized by using microanalysis (C, H, and N), DTA/TGA and other spectroscopic techniques. A nonplanar saddle-shape octahedral geometry was assigned to the macrocycles. The TGA results indicated the higher stability of these macrocycles over 250°C temperature. Cyclic volumetric studies showed the abnormal quasi-reversible behavior for these complexes, further indicating the unusual oxidation state on metal ions. In addition, these macrocyclic complexes possess good antimicrobial activities against *E. coli, P. aeruginosa, B. cereus, S. aureus* and antifungal against *C. albicans* when compared with Gentamycin.

Keywords: macrocycles, thermal behavior, cyclic voltammetry, and antimicrobial activity

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CONCLUSIONS

In this work, we designed, synthesized and characterized two macrocyclic complexes of Fe(II) and Ni(II). A thermal study shows that approximately 60% of weight loss up to 250°C of complexes. Thermal decomposition of macrocyclic complexes tells us about the absorbed moisture and their composition and thermal stability. The characterization outcomes are in great concordance with the proposed structure and composition of these complexes. Whereas, the electronic studies of the macrocycles indicated that the complexes shown to have a saddle-shaped distorted octahedral geometry. The electrochemical investigations demonstrated a comprehensive redox mechanism which gives a significant understanding of the biologically important macrocycles. Further, these macrocycles have indicated a great guarantee towards the antimicrobial activity against the various pathogens. We believe, this work will be helpful for the development of Schiff base based metal complexes and their potential application in electrocatalysis and biological areas.

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