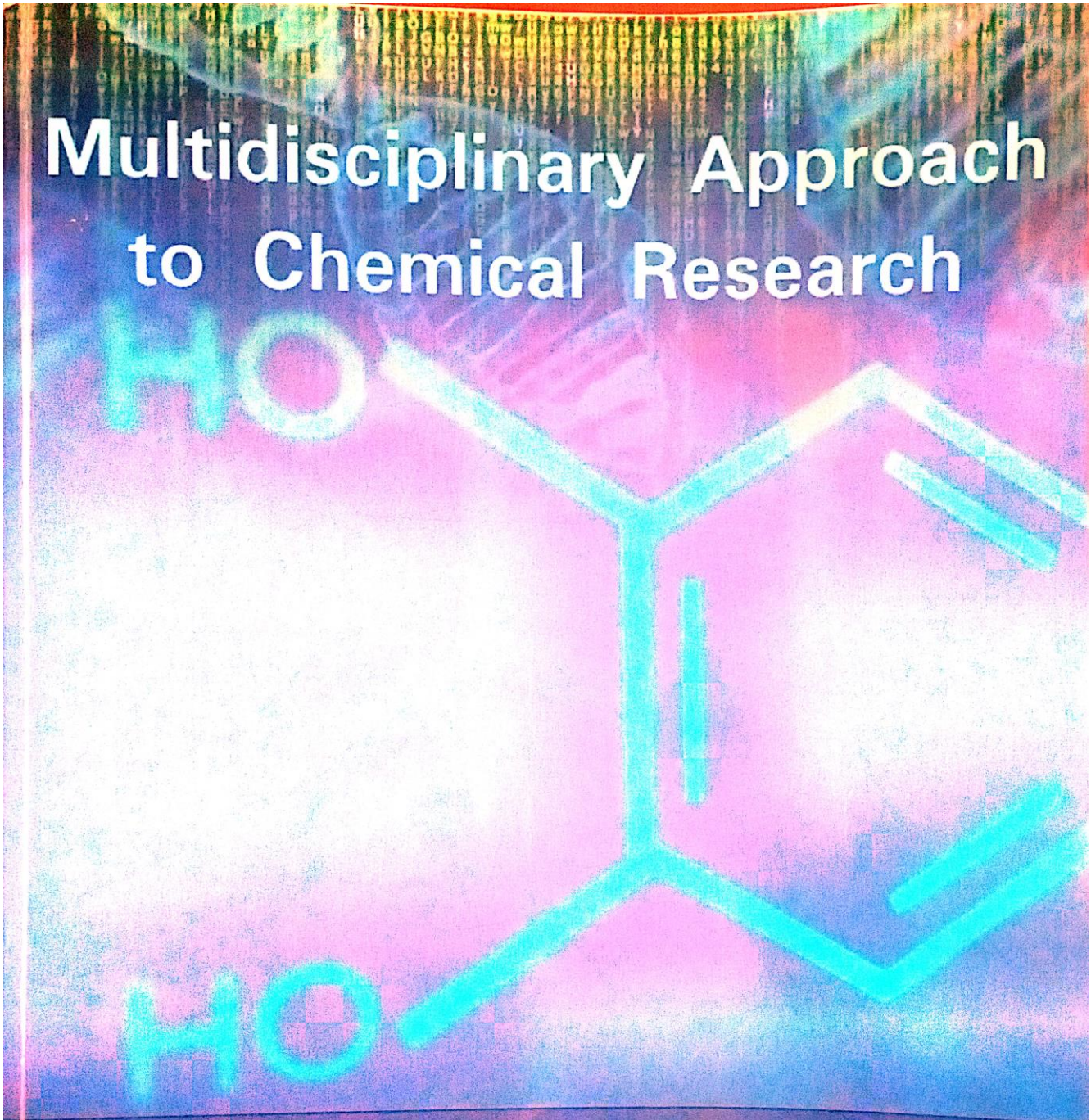
Multidisciplinary Approach to Chemical Research



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SYNTHESIS, SPECTROSCOPY TECHNIQUES AND THERMAL PROPERTIES OF ZIRCONATE COMPLEX

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Abstract:

Para toluene sulphonic acid (PTSA) is also called tosylic acid. The above said acid has three potential donor oxygen atoms and can be easily deprotonated in aqueous solution. In coordination complexes, sulphonic acids act as bridging as well as monodentate and as charge compensating anions. From literature analysis we are trying to prepare one-pot isolation of zirconium sulphonate with neutral hydrazine in aqueous medium. The isolated complex is characterized by various physico-chemical techniques. Physico-chemical studies reveal the compositions of the complex has $[Zr(PTS)_4(H_2O)_2].2N_2H_4$. The IR spectrum of the complex shows O-H stretching frequency in the region 3450 cm^{-1} revealing the presence of water molecules. The asymmetric and symmetric stretching frequencies of the sulphonate groups appear around 1350 cm-1 and 1175 cm^{-1}. The N-H and N-N stretching frequencies of hydrazine have been observed around the region of 3240 and 945 cm^{-1} confirming the presence of neutral hydrazine. Thermal analysis confirms the presence of coordinated water molecules. Further it decomposes continuously to yield metal oxide as the final residue. In all these observations the proposed structure of the complex shows six coordinated octahedral geometry. The title complex shows higher antibacterial activity.

Keywords- Hydrazine, Sulphonic acid, Thermal studies, Antibacterial study

1. INTRODUCTION

Coordination complexes have attracted many researchers world-wide because of their interesting molecular assemblies held together by forces, like, metal–ligand coordination, pi–pi stacking interactions and hydrogen bonding [1]. Hydrazine, N_2H_4, is the simplest diamine and has two active nucleophilic nitrogen and four substitutable hydrogen atoms. Even after getting protonated as N_2H_{5+}, it shows its ability to coordinate with several metal ions and forms several