



## **Pyrolysis kinetics of Mn (II) complex derived from Schiff base of 5-amino-1,2,3,4-thiatriazole with-ortho methoxy benzaldehyde**

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### **ABSTRACT**

*The Mn (II) complex derived from the Schiff base of 5-amino-1,2,3,4-thiatriazole with ortho-methoxy benzaldehyde exhibits significant structural stability and functional versatility. This study explores its thermal decomposition behaviour, stability, and reaction kinetics using thermogravimetric analysis (TGA). The Schiff base ligand, acting as a bidentate donor, enhances the stability of the coordination complex through the electron-donating properties of nitrogen and sulphur atoms. Kinetic analysis, performed using Doyle's modified method and Freeman and Carroll's approach, identified an activation energy of 11.93 kcal/mol, a reaction order of  $b = 0.43$ , and an entropy of activation ( $\Delta S$ ) of -25.33 e.u., demonstrating the reliability of statistical models in correlating experimental and theoretical data. The findings provide valuable insights into the thermal stability and degradation pathways of the complex under different conditions. Additionally, the Mn (II) complex exhibits diverse applications, including catalysis, material science, and environmental remediation, along with antimicrobial and antioxidant properties, making it a promising candidate for pharmaceutical applications. Its potential extends to the development of Metal-Organic Frameworks (MOFs), thin films, electrochemical sensors, batteries, fuel cells, and supercapacitors, highlighting its significance across multiple scientific and industrial domains.*

**Keywords:** Schiff base, Entropy of activation, Activation energy, Freeman and Carroll's.