INVESTIGATION OF THERMAL DECOMPOSITION KINETICS OF Cr, Mo, AND W HEXACARBONYL COMPLEXES OF THE SCHIFF BASE SALICYLIDENE–3-AMINO–1,2,4-TRIAZOLE USING THERMOGRAVIMETRIC METHODS

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A large number of Schiff base compounds are often used as ligands in coordination chemistry for their binding ability. Schiff base-metal complexes are characterized by interesting and important properties, such as their ability to reversibly binding oxygen in epoxidation reactions, biological activity, complexing ability towards some toxic metal, and catalytic activity in hydrogenation of olefins and photocromic properties. Polyydentate Schiff bases containing nitrogen and oxygen donor atoms are useful for the synthesis of transition metal complexes which play important role in biological systems. They were also found to provide catalytic characteristics especially for epoxidation reactions.

In this study thermal decomposition kinetics of Cr, Mo and W hexacarboxony complexes of the Schiff base salicylidene-3-amino-1,2,4-triazol (SAT) was investigated by non-isothermal (dynamic) thermogravimetric methods. FT-IR, 1H-NMR, MS were used for the investigation of the structural characterization of the ligand and the metal complexes.

The thermal decomposition of the synthesized complexes was studied in nitrogen atmosphere at the heating rate of 3 ºC/min, 6 ºC/min, 9 ºC/min and 12 ºC/min by using Shimadzu TG-60H thermogravimetry apparatus.

The thermal decomposition kinetics such as the activation energy, $E$, reaction order, $n$, and the pre-exponential factor, $A$ of Cr, Mo, and W hexacarboxony complexes with salicylidene-3-amino-1,2,4-triazol Schiff base were examined by using integral, differential and difference-difference thermogravimetric methods. No thermal decomposition data have been reported in the literatures for these complexes. Result of comparison of the dynamic thermogravimetric methods indicated that the most appropriate method for investigation of kinetic parameters related to thermal decomposition of metal carbonyl complexes were integral methods.

Reference