

CONCLUDING REMARKS

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The field of coordination chemistry of metal complexes with NO, NS and NSO donor Schiff base ligands is still gaining weight to the synthetic inorganic chemists. Various angles of researches of last few years have radically enriched this area of inorganic chemistry. It is also now well recognized that such Schiff base ligands get their value in different analytical applications, synthetic chemistry and inorganic biochemistry.

In the present investigation we have done a significant amount of work on the above lines and developed methods for the syntheses of different types of new transition and non transition metal complexes in varied oxidation states with new and known NSO and NO donor Schiff base ligands. This work is largely based on the Schiff bases derived from 3-formylsalicylic acid and related ligands,

In some of the metal complexes, isolated in this study, the single crystal x-ray diffraction study have shown the presence of different weak interactions (H-bonding, C-H π , π - π interactions etc.), responsible for 2-D and 3-D supramolecular architecture of these complexes. This might also enlighten the field of crystal engineering.

Since a few reports are available on the thiohydrazone ligand derived from 3-formylsalicylic acid and as the chemistry of Gr. IVA and Gr. IVB elements are very wealthy for commercial value, we have studied the synthesis and characterization of some organotitanium(IV), organozirconium(IV) and organotin(IV) complexes involving the thiohydrazone type ligand.

Some of the new compounds, synthesized in this investigation, have also been used as precursor for further new/novel syntheses. For example, the newly synthesized complexes $[(\pi\text{-C}_5\text{H}_5)\text{Ti}(\text{Hchbmthol})\text{Cl}]$ and $[\text{MeSn}(\text{Hchbmthol})\text{Cl}]$ (see Chapter V) smoothly react with MeSH, $\text{Me}_3\text{SiNMe}_2$ and $\text{Me}_3\text{SiC}\equiv\text{C-Ph}$ leading to the syntheses of new organotitanium(IV) and organotin(IV) compounds. Silylation coupled with desilylation is the driving force of the above reactions since the byproduct Me_3SiCl is a low boiling liquid, miscible with common organic solvents and is easily removed by low-pressure distillation.

Realizing the numerous importance and applications of vanadium compounds in their different oxidation states, we have also studied the syntheses and characterization of some vanadium complexes involving different dibasic tetradentate Schiff base ligands. Again, silylation along with desilylation have been used as an elegant route for the syntheses of vanadium-carbon bonded compounds.

As a result of interdisciplinary field of study, the solid-state properties (e.g. optical properties, variable temperature electrical conductivity etc.) of some the vanadium complexes have been explored, which instigated a new horizon in materials science. The study of biological activities might also produce some noteworthy conclusion.

A small portion of the work was done in this laboratory earlier by other students, which were repeated and extended further to get more meaningful results and included in this thesis.

Due to non-availability of good instrumental and other facilities, we could not study in detail the ^1H NMR, ^{13}C NMR, ESR, mass spectra, temperature dependent magnetic susceptibilities and x-ray crystal structures of all of the complexes isolated in this whole study which might focus the structures of the complexes vividly. Nevertheless, every effort has been made to interpret the physico-chemical data available in this laboratory and collected from other laboratories in such a way so as to arrive at a definite conclusion regarding the syntheses, characterization, reactions and the structures of the isolated complexes.