

Synthesis, Characterization and SEM analysis of 5-methyl-4-[(E)-(phenylmethylidene) amino]-4H-1,2,4-triazole-3-thiol and its metal complex with Cd(II) and Hg(II)

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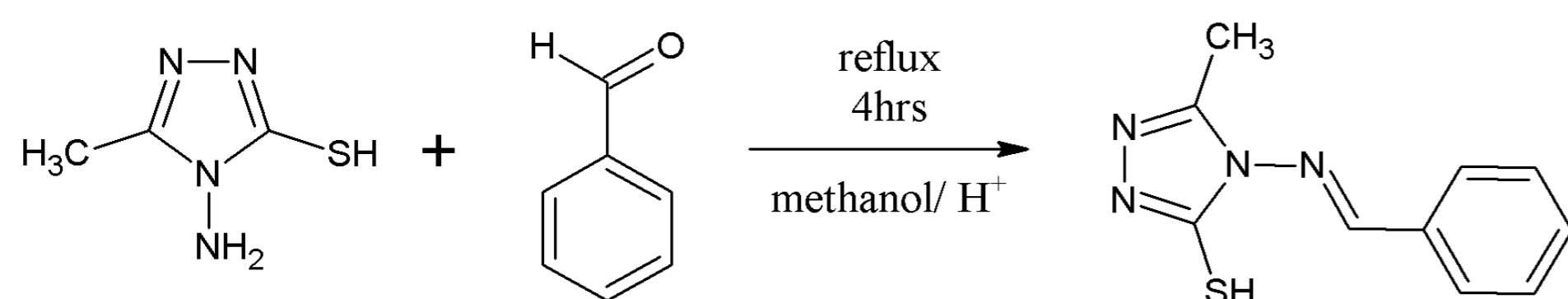
INTRODUCTION & AIM

Triazole containing compounds are of great interest in research due to their wide applications in pharmaceutical, industrial and catalytic properties. The Schiff base ligands and their metal complexes incorporating triazole moiety are of great interest due to structural diversities, bonding beauties and easiness in preparation.

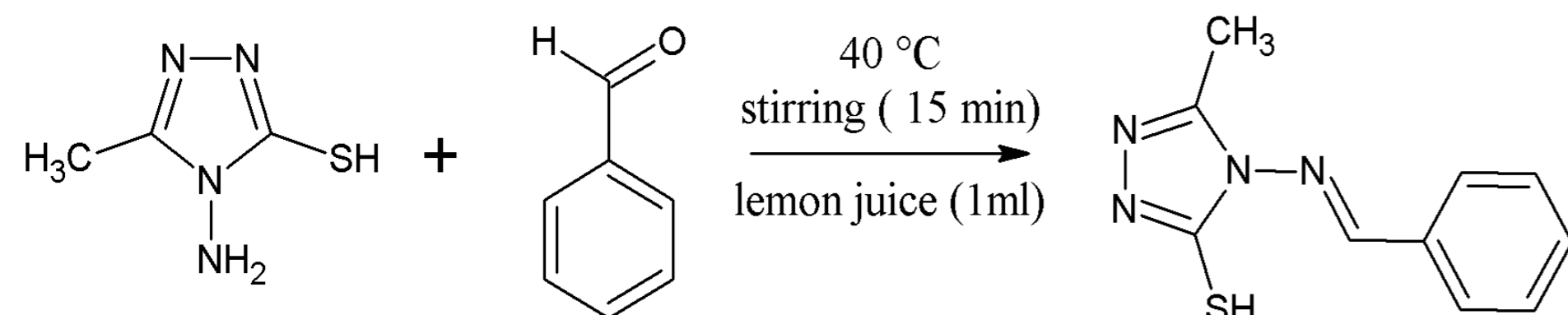
The aim of the research is to synthesize Schiff base ligand containing triazole unit and preparation of its complexes with Cd(II) and Hg(II). The prepared compounds have been studied by IR, NMR and SEM techniques.

METHOD

Conventional Method :



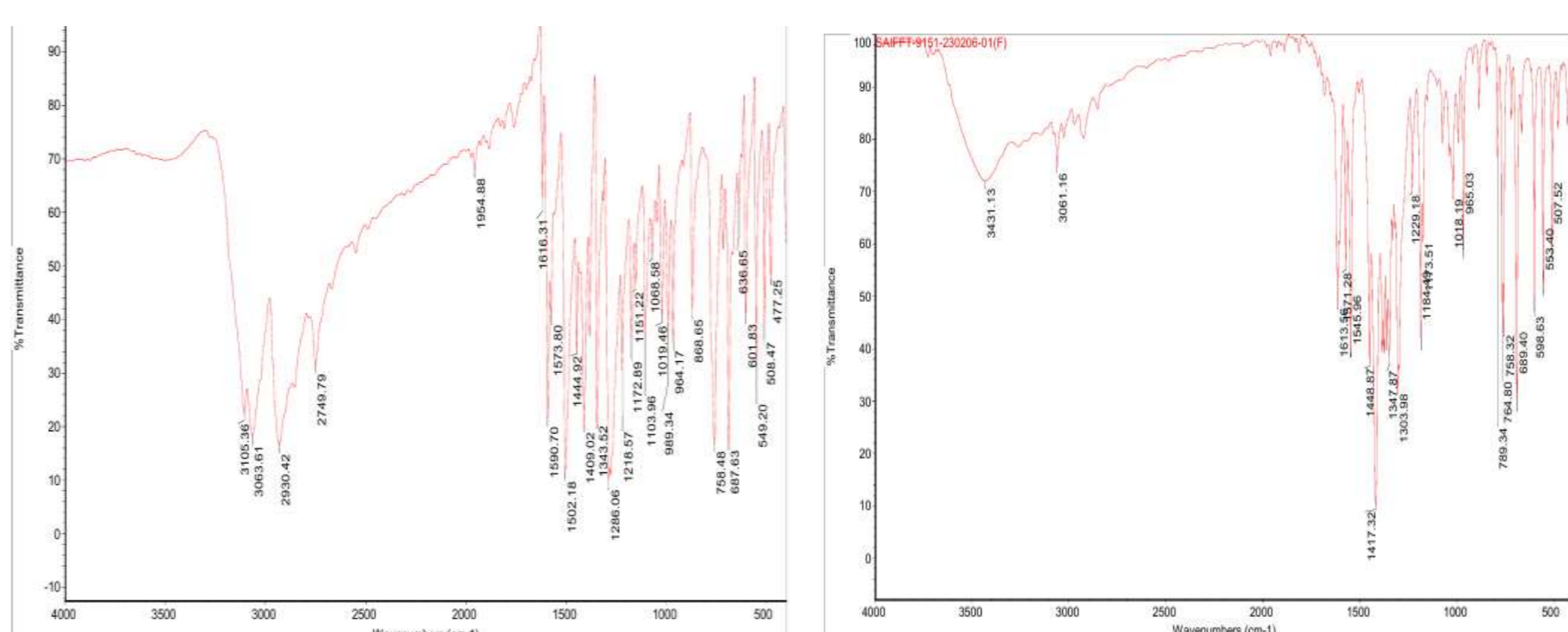
Green Solvent free Method :



Preparation of Metal Complex :

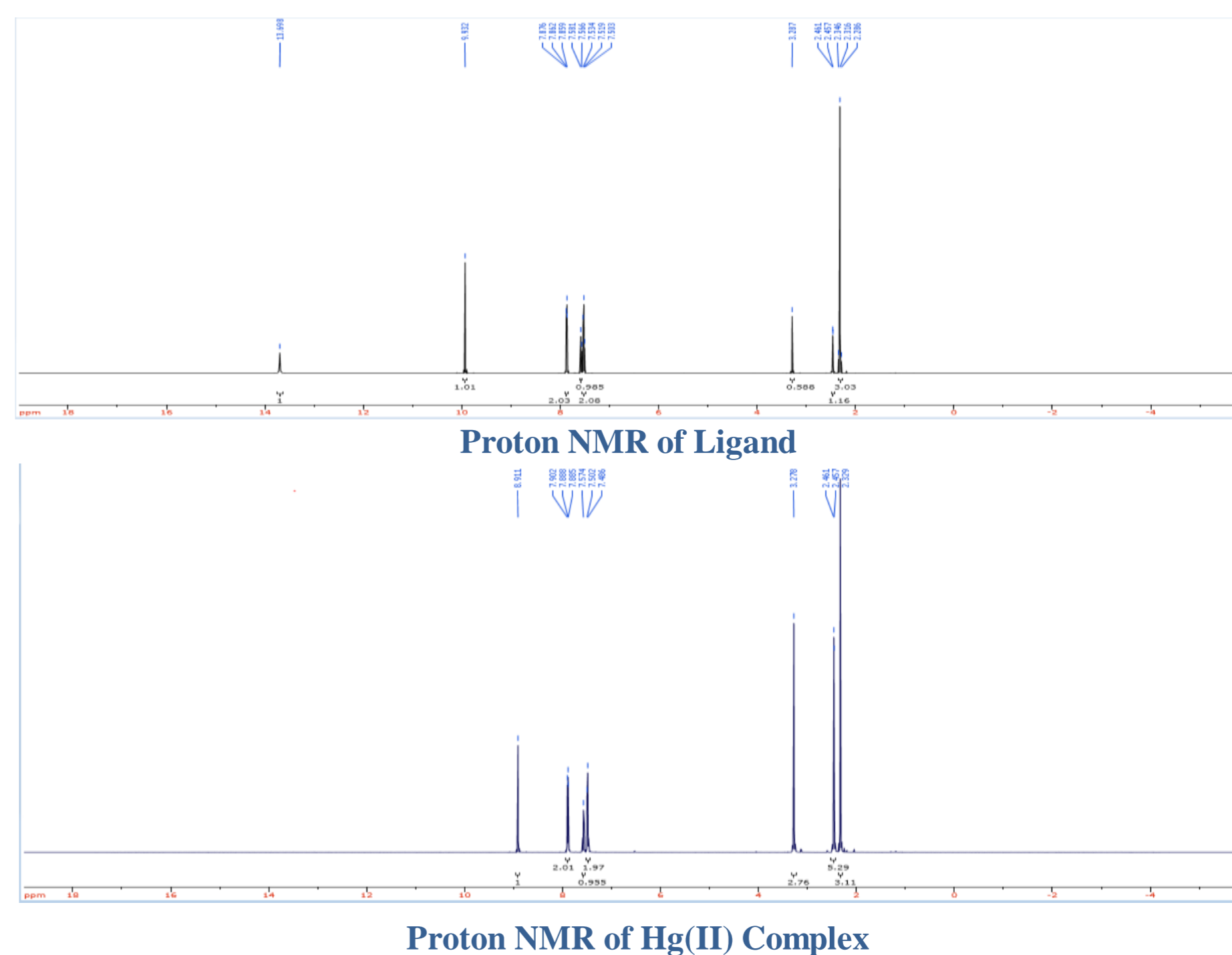
The ligand and HgCl₂ / Cd(NO₃)₂ in the molar ratio 2:1 were taken in methanol and refluxed for 2 hrs. The desired metal complexes were obtained on raising the pH of the solution by adding sodium acetate.

RESULTS & DISCUSSION



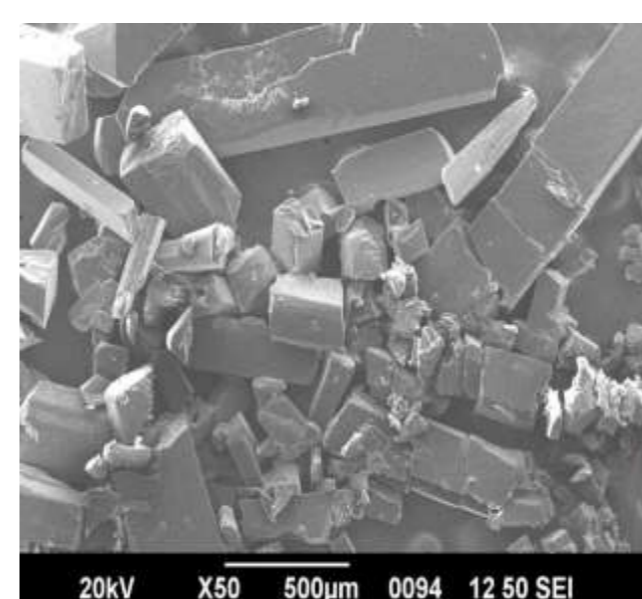
IR of Ligand

IR of Cd(II) Complex

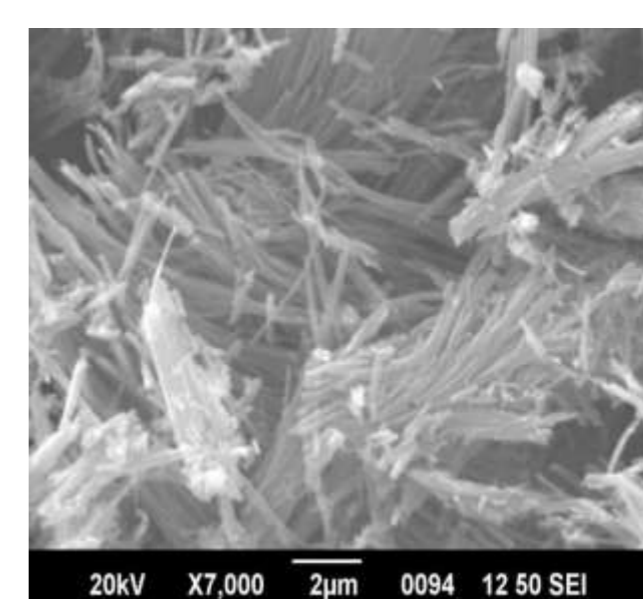


Proton NMR of Ligand

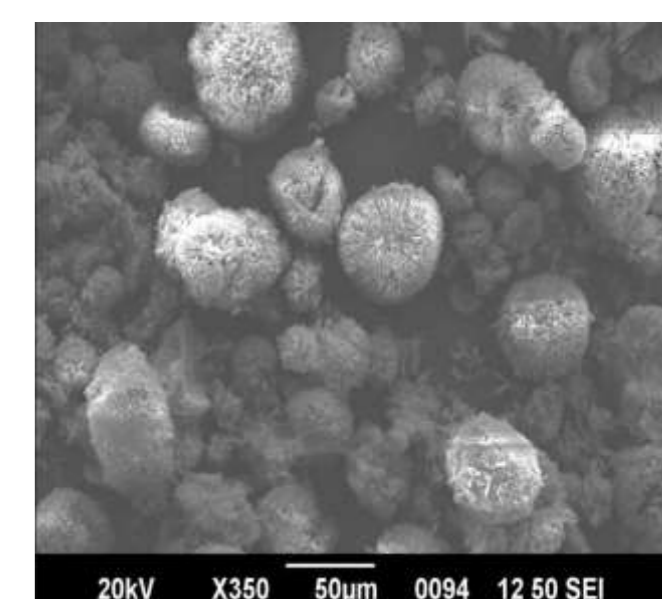
Proton NMR of Hg(II) Complex



Ligand



SEM of
Cd(II) Complex



Hg(II) Complex

CONCLUSION

- Ligand has been characterized by IR band of $\nu(\text{C}=\text{N})$
- Deprotonation of ligand is observed in Hg(II) complex identified by NMR spectra.
- The shifting of bands in IR spectra of complexes indicates that ligand is bidentate (N,S-donor) donating to metal through aldimine N-atom and deprotonated thiol group.
- The SEM data clearly indicates that surface morphology of ligand is smooth while the complexes have heterogeneous surface. The grains of ligand are cuboidal shaped, Cd(II) complex has fibrous grains while the grains of Hg(II) complex are spherical.
- The difference in the grain texture and morphology of the surface confirmed the formation of complex.

FUTURE WORK / REFERENCES

Biological and catalytic properties of the ligands and metal complexes can be studied further.