

## Synthesis, spectroscopic investigation and crystal structure of some novel uranyl complexes of isothiosemicarbazones

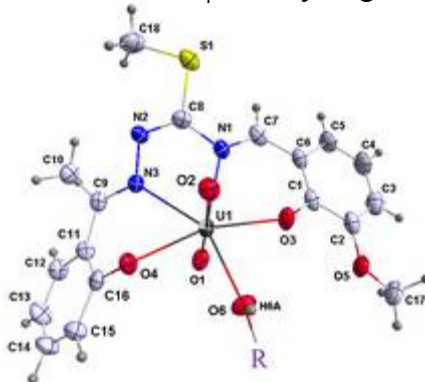
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### ABSTRACT

The metal complexes of thiosemicarbazones show versatile and interesting structures as well as extensive range of biological properties [1]. In isothiosemicarbazone compounds –as derivatives of thiosemicarbazones- an alkyl group binds to the sulfur atom, so that the coordination accomplishes *via* thioamide nitrogen instead of thioamide sulfur [2]. There are several synthesized metal complexes of isothiosemicarbazones and their crystal structures are investigated by X-ray crystallography [3]. Among them uranium complexes with luminescence and biological properties are very important [2].

In this project, some novel uranyl complexes of isothiosemicarbazone with different R groups are synthesized. Red products are prepared from template reactions in water bath of 60 °C in 1 hour and suitable crystals are obtained through slow evaporation of appropriate solvent. Characterization of the complexes are accomplished by spectroscopic techniques in addition to thermal gravimetric method. Fluorescence experiments show that all the complexes emit light in the range of 290-400 and 570-750 nm. The fluorescence spectra of the complex bearing benzyl fragment as the R group illustrates the maximum amount of quantum yield while in the other complexes with increasing the length of linear R group, the amount of quantum yield reduces drastically. Crystal structures of these compounds are explored by X-ray diffraction analysis which indicate that the complexes have distorted pentagonal bipyramidal structure bearing isothiosemicarbazone molecules as N<sub>2</sub>O<sub>2</sub> tetradentate ligands (Figure). Furthermore, in the supramolecular structures of all complexes, the molecules are linked together by means of paired O<sub>alcoholic</sub>-H...O<sub>phenolic</sub> hydrogen bonds.



**Figure:** The perspective view of uranyl complex, R: methyl, ethyl, allyl, buthyl, penthyl and benzyl

**Keywords:** isothiosemicarbazone, crystal structure, uranyl complex, fluorescence

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## REFERENCES

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