

## Studies on Some Dioxouranium(VI) Complexes with Dithiocarbamate Ligands

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### ABSTRACT

*A number of dioxouranium(VI) complexes of some monobasic bidentate dithiocarbamate(dtc) ligands have been synthesized. Monobasic bidentate dithiocarbamate ligands were prepared by the reaction of 1:1 molar ratio of ethylenediamine, N,N-dimethylethylenediamine, N,N-diethylethylenediamine, 1,3-propanediamine, N,N-dibutyl-tri-methylenediamine, 1,6-hexanediamine with carbondisulphide. Physico-chemical analytical, e.g. elemental analysis, IR Spectral data suggest the formation of  $[UO_2L_2]$  type complexes. The molar conductance values obtained for a number of complexes indicate the non-electrolytic nature of the complexes. The magnetic and electronic spectral studies of the prepared complexes indicate the presence of the  $5f^0 6d^0 7s^0$  electronic configuration characteristic of the  $6+$  oxidation state of uranium.*

**Keywords:** Carbondisulphide, Dioxouranium(VI) complexes, Dithiocarbamate, Ligands, Octahedral geometry

### INTRODUCTION

Transition elements of Group IV, V and VI are known to form mononuclear oxocations of the type  $MO^{n+}$  and  $MO_2^{n+}$ . The most thoroughly investigated, best characterized and most stable oxometal cations are the dioxouranium(VI), dioxomolybdenum(VI) and oxovanadium(IV) ions. Complexes of the uranyl ion,  $UO_2^{2+}$ , are of interest since they show four, five, six or seven-coordinate, pentagonal-bipyramidal geometry (Gatto et al., 2004). Due to the spectral properties (absorption and luminescence) and excited-state electron-transfer properties of the  $UO_2^{2+}$  ion, dioxouranium(VI) complexes have possible applications in solar energy conversion systems (Signorni and Dockal, 1996).

The Schiff base complexes with many transition metal ions, focused on complexes of the d-block elements, have attracted considerable interest because of their growing importance as model molecules for biological systems such as oxygen carriers. Dioxouranium(VI) complexes of some aroylhydrazines (benzoylhydrazine, salicyloylhydrazine, nicotinoylhydrazine) and their Schiff bases with acetone have been characterized where ligand acted as bidentate using NO-donor set (Chowdhury et al., 2008). The structure of the chelates of dioxouranium(VI),  $UO_2^{2+}$ , of the bidentate Schiff base ligands derived from o-hydroxyaldehyde or