STUDIES ON THORIUM COMPOUNDS
(Peroxo and some non peroxo)

A THESIS

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By

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C E R T I F I C A T E

This is to certify that the thesis entitled "Studies on Thorium Compounds", being submitted by Mrs. Vasantha Raman to the Indian Institute of Technology, Delhi, for the award of the degree of Doctor of Philosophy in Chemistry, is a record of bonafide research work carried out by her. Mrs. Vasantha Raman has worked under my guidance and supervision and has fulfilled the requirements for the submission of her thesis.

The results contained in this thesis have not been submitted, in part or full, to any other university or Institute for the award of the degree or diploma.

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PREFACE

This thesis embodies the results of investigations carried out on thorium peroxo and some non-peroxo compounds. The work carried out in the initial stages of the training is incorporated in the appendix.

Chapter I gives a general introduction to the subject covering the salient features of the peroxide chemistry of transition elements and thorium. The structural aspects of these compounds are briefly reviewed. Aqueous chemistry of thorium is discussed. The scope of the present investigation is indicated.

Chapter II incorporates investigations on thorium peroxide species obtained in presence of nitrate, sulphate, and perchlorate ions. The solid species obtained have been subjected to physico-chemical studies like, IR, Raman, TGA etc. The nature of the anions associated with the peroxide, bonding and stability of the peroxo group, 'O-O' and nature of water molecules in the above species are discussed. Exact structures are difficult to be arrived at, as the species are poorly crystalline.

In Chapter III results on investigations on thorium peroxosulphato complex is presented. This compound is well defined and crystalline in nature. But its single crystals could not be grown as it is insoluble in most of ~~the~~ the

solvents and decomposes on heating. The complex has been subjected to some physicochemical studies. This is followed by studies in synthesis of new peroxo species of thorium in presence of fluoride, EDTA, oxalate and salicylic acid. Salient findings of the present investigations on thorium peroxo species have been summarised. (p - 102)

Chapter IV deals with studies carried out on some non peroxo species. Two new oxide sulphates of thorium have been isolated and characterised. They are formed as a result of thermal decomposition of thorium peroxo sulphato species. A brief account is given about thoryl ion and its possible existence if any. Thorium salicylate, thorium cupferrate and thorium hydroxy chromate have been examined by IR studies for bonding features.

The appendix, contains results of IR and Laser Raman studies on some chromium oxo complexes.

C O N T E N T S