

PREFACE

Recently, the rare earth phosphates and vanadates have created a new dimension in the field of radioactive waste management and solid-state laser. Rare earth arsenates and niobates are very much structurally similar to these compounds. Especially, rare earth arsenates are directly structural analogs of these above compounds. Furthermore, the synthetic forms of rare earth arsenates and niobates are very much attractive because of the reported ferroelectricity and ferroelasticity in these two types of compounds respectively. It is well known that the materials having these properties form a very important class because of their wide spectrum of applications in electronic devices, as a host material for nuclear waste isolation etc. Hence a systematic study is required to investigate their various interesting properties.

The present work consists of the preparation of specimens of rare earth arsenates and niobates and their characterization by following studies :

- (i) X-ray and scanning electron microscopic studies,
- (ii) Thermal analysis,
- (iii) Dielectric properties,
- (iv) Laser Raman, infrared, infrared reflection and optical absorption studies.

The aims of these investigation are to understand the existence of ferroelectric and other physical properties of these materials. The work reported in this thesis is a part of such programme.

The thesis is mainly divided into seven chapters.

Chapter - I presents General Introduction, brief literature survey, materials studied and aim and scope of the present work.

Chapter - II gives the brief description of the methods of studies.

Chapter - III deals with the various methods of sample preparation of RAsO_4 and RNbO_4 .

Chapter - IV reports the X-ray and SEM analysis of RAsO_4 and RNbO_4 .

Chapter - V gives the study of thermal properties (TGA, DTA and DSC) of RAsO_4 and RNbO_4 .

Chapter - VI presents the study of dielectric properties of RAsO_4 and RNbO_4 .

Chapter - VII deals with vibrational and optical absorption studies of RAsO_4 and RNbO_4 .

A summary of the conclusions of the work has been presented just after Chapter - VII.

References having a bearing on the present work have been compiled to the extent possible and given at the end of the relevant chapters.

References to the research papers published by the author are given at the end of the thesis.

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