Preface

Photoconductivity is used as a powerful tool in the understanding of solid state physics.

- It reaches both into semiconductors and into insulators
- It illuminates the internal electronic processes in materials and in their well known device forms: transistors and phosphors.

In the light of the improved understanding of photoconductivity and its growing importance both as a scientific tool and as a basis for new devices, the present thesis entitled "Photoconducting studies of some rare earth doped systems" is presented. The total work included in the thesis is divided into six chapters.

The first chapter covers the following aspects

- Introducing the subject
- Brief discussion of the various parameters affecting the photoconducting properties
- Problem undertaken for the present investigation
- Various theories used in the understanding of phenomenon of photoconductivity
- Different models used to explain the phenomenon

The second chapter throws light on the film preparation and various measuring arrangements used in the present investigation. This chapter includes:

- Summary of the different methods used in the preparation of photoconductors in different forms
- Summary of the different methods of the thickness determination
- Method used in the present investigation. It also describes the various experimental arrangements used in different studies

The third chapter deals with the photoconductivity studies of rare earth doped (Cd-Ph)S films. It covers:

- The nature of dark current, photocurrent and the ratio \( I_{pc}/I_{dc} \) [gain] with respect to various preparative conditions
- Lifetime, mobility and trap depths have been determined by analyzing the decay curves
- Results and discussions on effect of different irradiation conditions, annealing etc
• Results and discussions on effect of excitation intensity and ambient temperature
• Effect of selective removals of the layers are discussed

The fourth chapter presents the details of spectral studies
• Results of optical absorption spectra are presented
• Results of photoconductivity excitation spectra are reported
• The behaviour of absorption coefficient is discussed and is used for the determination of band gap

The fifth chapter concentrates on the characterization studies of materials. It covers mainly the following studies:
• Scanning electron microscopic studies
• X-ray diffraction studies

The sixth chapter has been devoted to photoluminescence studies
• Photoluminescence spectral studies
• Photoluminescence decay studies
• Photoluminescence brightness as a function of temperature

Lastly the future scope of the present work has been discussed in brief