SUMMARY

This thesis embodies the study of optical absorption spectrum of KCl:Tl crystals having Tl concentration of the order of 10^{-1} mole per cent. The absorption spectra have been investigated before and after ultraviolet irradiation at liquid nitrogen temperature. Changes in the absorption spectrum brought about by pulse annealing have also been investigated. The absorption spectrum before and after ultraviolet irradiation at room temperature has also been recorded. Another part of the study is concerned with the Thermoluminescence of KCl:Tl phosphors around room temperature after ultraviolet and X-ray irradiation.

The thesis is divided mainly into 4 chapters. The first chapter is a general introduction to the present work. A brief survey of the past work in the field of optical absorption and thermoluminescence of potassium chloride activated with thallium phosphors is presented in chapter 2. This chapter is further divided into three sections: one on the coloration of solids, second on the luminescence of KCl:Tl and third on the optical absorption of KCl:Tl. The description of the experimental setup and techniques employed have been presented in

chapter 3. The results obtained and the interpretations offered are presented in chapter 4. Mainly the absorptions at 205,214,225,242 and 260 mμ are discussed. The centres suggested involve isolated substitutional Tl^+ ions, substitutional Tl^+ ions with OH^- ions at neighbouring sites, two Tl^+ ions at neighbouring K^+ sites and charged complex ion centres of $(TlCl_n)^-$ type. The model for the glow peak at around 300°K in the thermoluminescence study has been discussed. It is suggested that the phosphorescent centre consists of a Tl^+ ion and a negative ion vacancy.

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