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# Optical character inquest of cobalt containing fluoroborate glass

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## Abstract

Glass samples of Fluoroborate glasses of composition  $80\% B_2O_3-15\%-NaF-5\%CaF_2$  containing different amounts of CoO (0.2, 2, 3 %wt) were successfully prepared by melt annealing technique. The samples were characterized using UV-VIS-NIR and FTIR spectrometry. The results showed that the optical properties of the samples are dependent on the Co content within the glass matrix. The optical absorption and transmittance spectra confirmed the incorporation of the CoO in the glass matrix. CoO doped samples showed a blocking region within the visible area which belongs to the tetrahedral Co ions and a transmittance region in the UV. Increasing the CoO content leads to increasing the FWHM of the blocking band and decreasing in the FWHM of the transmittance band. The FTIR spectra showed the characteristics absorption peaks of the triangular and tetrahedral groups in the glass matrix. The existence of CoO leads to resolving and enhancing the bands in the glass samples. The experimental results and the calculated optical parameters for the glass samples recommend them as a promising candidate for band pass filter applications.

Keywords;

Fluoroborate glasses; band pass filters; UV-vis. Spectroscopy; FTIR; Cobalt oxide.

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## 1. Introduction

Borate glasses can be considered as a versatile type of glasses which are used in different applications because they possess optical properties and high thermal stability. Addition, it is considered as good host glass materials for transition metal ions and rare earth ions and metals. During the past few years, there was a considerable interest in the study of borate based glasses

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