Abstract

In this research, laser intensity attenuators have been produced from molecules absorbed in the (NIR) region, especially in the two laser wavelengths 820 and 810 nm. This was done by mixing various portions from three substances: Calcium Fluoride (CaF_2), Zink Sulfide (ZnS), and Photocopier Ink.

Spectral measurements were taken for the three molecules individually. Samples in the shape of disks were manufactured with 1.63 mm in thickness with different concentrations of both (ZnS) & (Photocopier Ink), but the portion of (CaF_2) was constant due to its weak absorbance in the spectral region between 800-850 nm.

The laser intensity measurements were taken in the beginning, and regarded as the reference one (I_o). Then the intensity was measured each time in the presence of the sample, and the transmitted intensity through the sample was regarded as the laser intensity after attenuation (I).

The relationship between the concentrations of the (ZnS) and the (Ink) was plotted for each sample with the laser intensity from which Bert-Lambert law was verified. It was proved that the attenuated intensity could be controlled by means of controlling the concentrations of ZnS or Ink in the manufactured attenuators. Then the relation between $\ln I_o / I$ with their concentrations was ploted and the absorption coefficient for each attenuator was calculated where it was 0.042, 0.04 cm^{-1} for ZnS and 0.043, 0.041 cm^{-1} for Ink, for two lasers (810) nm, (820) nm, respectively.

From the obtained results, there is a suggestion to make other attenuators from the same substances or others for different wavelengths so as to be emploied in various laser applications.