OPTICAL PROPERTIES OF $AgInTe_2$ Films

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The optical properties of $AgInTe_2$ thin films of different thicknesses were studied. Transmittance and reflectance measurements were used to calculate the energy gap width, the width of localized states, and the optical constants n & k. We came to the conclusion that the energy gap width decreases as film thickness increases, while the width of the tail of the localized state increases. We also found that as the wavelength increases, the value of the refractive index increases, particularly, in the wavelength range larger than 800 nm, while the absorption index decreases in the range from 500 nm to 1200 nm.

Introduction

The investigation of the optical properties of thin semiconducting films is of considerable scientific and technological interest. Their properties are defined mainly by their thickness, structural features and electronic structure. Measurements of optical properties allow to obtain critical information about the energy band structure and electron transitons.

Ternary chalcopyrite semiconductors have attracted recently a great interest because of their properties and possible applications [1,2,3,4]. $AgInTe_2$ is a ternary compound semiconductor which crystallizes in the chalcopyrit structure [5].

The aim of this contribution is to study the optical properties of $AgInTe_2$ films. Zhuse [5] had measured the forbidden energy gap for single crystals $AgInTe_2$ by the electrical conductivity and found to be 0.93 eV.

Experimental procedures

$AgInTe_2$ samples were prepared by melting the proper amounts of highly pure component elements (99.999%) taken in their stoichiometric ratios. The materials were