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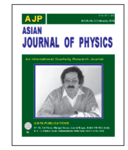
Asian Journal of Physics
Vol. 25, No 11 (2016) 1453-1465

Available on: www.asianjournalofphysics.in



On the correlation and analysis of some useful optoelectronic properties of mixed II-VI compounds

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We report here the compositional dependence of parameters like electronic polarizibility, magnetic susceptibility and energy band gap of some mixed ternary II-VI compounds using correlation process and discussed the lattice matching condition for obtaining useful crystals together with the potential of InP/ ZnCdSSe, CdS/ZnCdSSe quaternary alloys for useful devices.

Keywords: Electronic polarizibility, magnetic susceptibility, energy band gap, electronegativity

1 Introduction

In the recent years, technological interest have been shown in the optical devices that can operate in the wide spectrum range which motivated research work in II-VI materials and their mixed versions [1-3] for the development of new semiconductor materials. The broad range of band gaps of the II-VI semiconductors plays a key role to make study on them. Many of the II-VI semiconductors have direct band gap [4,5] along with a high optical absorption and emission coefficients. As the band gap of the II-VI compounds covers the spectrum from ultraviolet to infrared, so can be the basis for a variety of efficient light emitting devices. Further they are useful for applications as absorber for photovoltaic devices and in solar cells. They also provide unique optical, electrical and magnetic properties. The search of the new compounds leads to the study from the binary to quaternary through ternary alloys. Both ternary and quaternary alloys offer new possibilities for material engineering as their basic important parameters like lattice constant, band gap energy and valence band offset can be controlled independently. II-VI ternary and quaternary compounds are getting considerable interest because they may give access to lattice matching with other II-VI or III-V semiconductors along with controllable band gap for potential applications in optoelectronics and photovoltaic solar cells. It is reported that ZnS_xSe_{1-x} is a promising compound for optoelectronics devices including wave guides and blue light emitting diodes [6]. The reduction of the lattice mismatch may be obtained by graded layers of mixed crystals. Thus growth and characterization of the compound semiconductors are playing an important role in modern material science. Beside different design parameters like energy band gap, refractive index, ionicity, thermal expansion coefficient, effective mass etc. electronic polarizibility and magnetic susceptibility are also very important. In this context [2 ,3, 6] we have studied ternary compounds like ZnSSe, ZnCdS, ZnCdSe, ZnSTe, ZnSeTe, ZnCdTe, CdSeTe, CdSTe, MgZnSe etc and the quaternary compound $Zn_{1-x}Cd_xSySe_{1-y}$. In this paper, we have reported the values of the electronic polarizibility and magnetic susceptibility for some mixed ternary compounds mentioned above. Again choice of suitable substrate to grow good quality crystals is very important. In heteroepitaxy, when materials are

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