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Enrichment of Photoluminescence Quantum Efficiency in Semiconductor Based on the Einstein Mass Energy Relation

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ABSTRACT: Quantum mechanical existences of hole in semiconductor are longevity for existence of modern semiconducting technological devicesin addition to the existence of electron. Existences of hole and variation of its propertiescauses greatly influences the changes in physical properties of semiconductor and these properties predominately influences at reduced dimensionalities also In detail quantum mechanical knowledge of physics parameters and fundamental nature of semiconductor is of great interest in order to evaluate their potential use in a wide class of optoelectronics devices such aslaser diodes, photo luminescent diodes and light emitting diodes.

Theoretically, realization and characterization of hole and its parameters is great challenge under the different cases which in turn influences devices performance. Along with stabilization of energy gap is one of the most import achievements in semi conducting materials with respect change in quantum vacancy (hole) properties. Meanwhile the energy gap is important to determine the region of the light spectrum where the semiconductor can be applied like photonic device.Detail theoretical analysis on hole and its properties useful in understating of semiconducting properties such as recombination process, life time of charge carriers. All the theoretical work has been considered to understand the complete behavior of the semiconducting materials in order to suit them effectively for technological applications.

KEYWORDS: Luminescence, energy gap, lifetime of charge carriers

I. INTRODUCTION

The last few decades have seen the birth of a great diversity of products and services associated with electrical and electronic equipment, which are subject to constant change with advancement of quantum mechanics [1,2]. During the last few years, since semiconductor manufacturing processes have gradually diminished in size, the number of transistors that can be fabricated on a sole silicon wafer can amount to a billion units. In order to account for the dynamic evolution of production and distribution and changes caused by technological advances,due to rapid changes in the demands in field of science and technologyneed to be flexible and to be able to adapt quickly to a constantly changing environmentthrough fundamental enrichment of science [3-5].

The knowledge of physics parameters of semiconductor compounds is of great interest in order to evaluate their potential use in a wide class of optoelectronics devices. These parameters have been investigated not only experimentally, but also theoretically. From the standpoint of the latter, crystal lattice energies are important in considering the stability of new materials and reflect the natural tendency towards the organization of matter, meanwhile the energy gap is important to determine the region of the light spectrum where the semiconductor can be applied like photonic device[6]. Realization and stabilization of hole and its properties is great challenge under the different cases which in turn inflecting devices performance. Along with stabilization of energy gap is one of the most import achievements in semi conducting materials with respect internal factors as well as external factors [7]. The present work, more attention is given to understand the formation of holes and its properties are studied with help of Einstein mass energy relation in semiconductors. In order to understand the semiconducting properties such as