Study on Photoconductivity in Semiconductor

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ABSTRACT

The variation of conductance injected by the photon illumination in the semiconductor material are called the photoconductive effect. When the photon energy are absorbed by the semiconductor material, the electron in the valence band gotten enough energy can transit to the conduction band as if the photon energy larger than the energy gap. This behavior induced the cesses carrier concentration which are contributed to the increasement of conductivity. The spectrum of photoconductivity in the different position of light spot on the semiconductor has been measured. It has been found that the characteristic of photoconductivity is dependent on the variation of spot position due to the property of carrier transport. According to the measurement of photoconductivity at different temperature, we obtained the energy gap depended on the temperature as following the Varshni ’ s equation. We also obtain the impurity center from the I-V curve experimental. From the thermal stimulated current measurement, the character peak at 50K due to the transition of carrier between the excited state to ground state, in the impurity center level. This impurity center energy are about 70meV which is agreement in the previous result. The absorption edge depended on the light radiated position is due to the not uniform concentration of carrier in the measurement of PC with different light spot position. From these result we can detected the optical property of semiconductor using these simple measurement.

Keywords : photoconductivity ; Hall effect ; I-V curve

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