
Semiconductors are extremely sensitive to impurity atoms (doping), defects and charge carriers. If the charge carriers are introduced by doping magnetic impurity atoms into the host lattice of semiconductors, the material would possess magneto-optical properties. The realization of materials that combine semiconducting behaviour with magnetism has long been a dream of material physicists. Adopted a strategy for creating systems that are simultaneously semiconducting and magnetic is initiated in the 1980’s by introducing local moments into well-understood semiconductors.

The DMS materials are conventional semiconductors, in which appropriate fraction of the original atoms is substituted by elements which are capable to introduce the localized magnetic moment. These materials are commonly known as dilute magnetic semiconductors (DMS). Due to this substitution, these materials not only retain the semiconducting properties, but can also possess magnetic properties. In order to develop multifunctional devices, it is essential to combine both the properties of electron; charge and spin. In this the spin of electrons that carries the charge and spin property of electron is combinely known as spintronic or spin transport electronics [1].

The binary intermetallic compound InSb was synthesized in 1929 with a zinc blende structure [2]. But the In-Sb phase diagram was fully explained in 1952 [3]. Indium Antimonide (InSb) is an III-V group low gap semiconductor, low effective mass (0.014 me), and high electron mobility at RT [4,5]. Due to it being low band gap semiconductor, it has been particularly attractive as a potential material for high performance devices, low temperature diodes, infrared detectors, IR laser devices, X-ray monochromation detector, optical-immersion lenses as well as magnetic sensors [6-9].

InSb has the highest RT mobility (7-8 × 104 cm2 V−1 s−1) amongst semiconductor, due to this mobility range InSb thin films are widely used in magnetic sensors.

Pramila Mohan et al. [10] reported the growth of the InSb bulk system, which is used for infrared device application. Maske et al. [11] reported the Bi doped InSb bulk crystals prepared using Vertical Directional Solidification (VDS) technique and characterized for various studies. Gadkari et al. [12] reported the characterization of p-type and n-type InSb bulk using VDS technique. Grober et al. [13] reported the time resolved photoluminescence studies of bulk InSb. Ebnalwaled AA [14] reported the growth of InSb crystal using the vertical Bridgeman technique and results is compared with previous studies. While in one of the study by Ebnalwaled [15] reported the hopping conduction and dielectric properties of InSb bulk crystals. Recently Hnida et al. [16] reported the electrochemically deposited nanocrystalline InSb with its electrical properties. There are many reports which show the various properties of pure InSb bulk. Apart from the studies of pure InSb there are many reports available with the inclusion of the various elements [17-19] in InSb bulk.

Gadkari et al. [17] reported the high mobility of InSb bulk with the doping of Tellurium. Shigeo et al. [18] reported the thermo-electric properties and figure of merit of the Te doped InSb bulk. Deshpande et al. [19] reported the optical characteristics of dilute Nitride doped InSb bulk.

These results based on the studies of InSb in form of bulk and thin film may lead to realization of various applications such as IR detectors, magnetic sensors, and temperature sensors with an additional application of spintronics.

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