Optical spin injection study on In adsorbed Si(111) surfaces

N. Arzate, B.S. Mendoza and R.A Vázquez-Nava

Photonics Division, Centro de Investigaciones en Óptica, A.C., México.

Recently the study of optical spin generation into nonmagnetic semiconductors has received attention in the field of spintronics. Optical excitation of semiconductors with circularly polarized light creates spin-polarized electrons in the conduction bands. This effect occurs as a result of the entanglement of electron spin and motion caused by the spin-orbit coupling in the semiconductor. We present a theoretical study of the optical generation of one-photon spin injection on to Si(111) surfaces wherein chains of In adatoms are arranged. In particular, we analyze the surface Si(111)-4X1. We report calculations for the degree of spin polarization on the surfaces due to light absorption. Our calculations are performed in a full-band electronic structure scheme at the level of the GW method. We compare and discuss our results with previous calculations performed on Si and GaAs surfaces.

Keywords: Spin injection; Surfaces;

References