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Fabrication and characterization of the Si p-n junction prepared by thermal diffusion

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This work presents fabrication and characterization of a p-n junction in Si. The p-n junction was fabricated simply by thermal diffusion of n-type Si wafer with boron deposited on the surface. The depth of the p-n junction was primarily predicted by the Fick's law of diffusion. Boron deposition was carried out in a vacuum system using an electron beam evaporator. The deposited samples were annealed in the same vacuum system to introduce boron diffusion into the Si substrate. V-I curve measurements were performed to characterize the electrical properties of the p-n junction. Appropriated depth and width of depletion region will be discussed for application of X-ray detectors.

Keywords: boron diffusion, p-n junction, thermal annealing, electron beam evaporation, silicon semiconductor

Author: Mr TOARUN, Nanthawat (School of Physics, Suranaree University of Technology,)

Co-authors: Dr JANPHUANG, Pattanaphong (Synchrotron Light Research Institute (Public Organization)); Dr EKNAPAKUL, Tanachat (Suranaree University of Technology); SONGSIRIRITTHIGUL, Prayoon (Suranaree University of Technology); Dr EUARUKSAKUL, Chanan (Synchrotron Light Research Institute (Public Organization),)

Presenter: Mr TOARUN, Nanthawat (School of Physics, Suranaree University of Technology,)

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