Investigation on terahertz radiation from p-InAs epilayer grown on n-GaSb

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P-type InAs layer was elaborated on a (100)-oriented n-GaSb substrate via molecular beam epitaxy and using a growth initiation scheme. The resulting p-InAs layer exhibits facets and islands with thickness ranging from 600 nm to 1.4 μm. The terahertz (THz) radiation from the p-InAs/n-GaSb sample was then studied using a conventional THz-TDS setup in an attempt to find alternative materials with THz emission comparable to bulk p-InAs. The p-InAs epilayer was irradiated by a Tsunami femtosecond laser centered at 800 nm and delivering 100 fs pulses at a repetition rate of 80 MHz. The laser was incident at 45^0 with the surface normal (reflection excitation/detection geometry) of the sample. In particular, the power dependence as well as the azimuthal angle dependence of the THz radiation intensity were measured. Figure 1 shows the THz signal amplitude as a function of laser power. The peak intensity is observed to increase monotonically. This is explained in terms of photo-Dember effect. In addition, it can be surmised from the azimuthal angle dependence result that the p-InAs layer is highly-oriented crystalline material. The results demonstrate the capability of p-InAs layer grown on GaAs-buffered n-GaSb for THz emission.

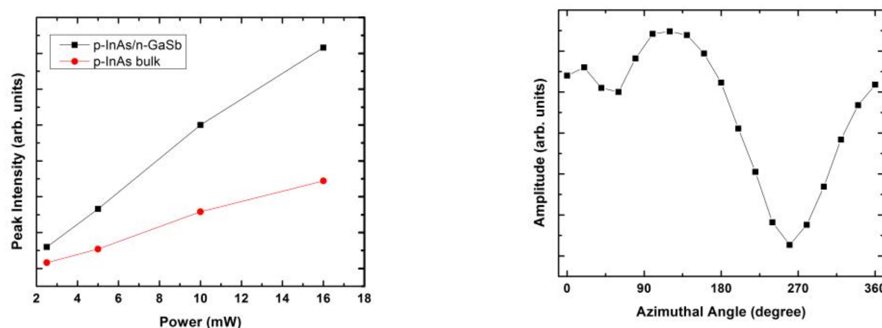

Figure 1. (Left) Power dependence and (Right) azimuthal angle dependence for the p-InAs layer grown on GaAs-buffered GaSb.

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