

**Improved photo-characteristics by changing the light absorption
mechanism by the change of the fermi level in topological PN junction
Sb₂Te₃/Bi₂Se₃**

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Although the outstanding performance of the topological PN junction (TPNJ) is expected through theoretical calculations, applying the TPNJ structure to the device have not been sufficiently conducted. Especially, broadband absorption and high mobility of topological insulator is attracting attention in photo-device. Furthermore, the junction effect acting as a major role in the photo-device should be studied for enhancement of optical performance in the TPNJ structure.

In this study, the photo-characteristics in the TPNJ structure which was effectively stacked without intermixing using MBE growth method and controlling the annealing process were investigated. In order to precisely analyze the junction effect from the perfect formation of interface, a cross pattern was implemented to compare the photo-characteristics in a single device. As a result, it was revealed that the photo-characteristics was improved at the TPNJ structure: i.e., the performance enhancement was caused by the change in the absorption mechanism by a modulation in Fermi level as well as an effect of band bending.