

Consideration of annealing effects for CdTe diodes fabricated by laser doping method

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CdTe semiconductor has been used as radiation detectors at room temperature. Impurity doping of CdTe has been considered difficult because it requires high temperature heat treatment and characteristics are degraded. However, the laser doping method that we have recently developed is overcoming this problem. When doping semiconductors, not all dopants act as donors or acceptors, and some of them become defects in the crystal. In response to the presence of such inactive dopants, for example, ion implantation undergoes an annealing process to promote the activation of the dopants. On the other hand, when CdTe is annealed above 150°C, the characteristics of diodes and detectors are degraded, such as increased reverse current and decreased hole mobility. Therefore, annealing has been considered difficult for CdTe. The I-V characteristics of CdTe pn diodes doped by laser-induced backside doping do not degrade when heat-treated above 150°C, and in fact I-V characteristics are improved. Therefore, it was assumed that annealing of CdTe might be possible because the characteristic degradation due to annealing that has been reported could not be measured. The CdTe pn diodes fabricated by the laser doping method was annealed and investigated the annealing effect. CdTe Schottky diodes (In/CdTe/Au) were also fabricated, annealed, and compared to CdTe pn diodes. Annealing process was performed in a nitrogen atmosphere up to 400°C. As a result, it was found that heating at 400°C may have had a fatal effect on CdTe. Details will be discussed on the day.

Topics

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