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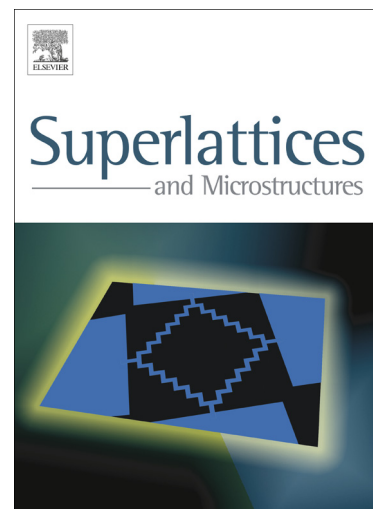
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Highlights

1. $\text{Tl}_2\text{GaInSe}_4$ crystal was prepared by a special design based on Bridgman technique.
2. The Hall coefficient indicates that the $\text{Tl}_2\text{GaInSe}_4$ has the p-type conductivity.
3. The acceptor level is located at 0.33 eV above the valence band of $\text{Tl}_2\text{GaInSe}_4$.

Abstract

Electronic transport properties of $\text{Tl}_2\text{GaInSe}_4$ prepared by Bridgman technique have been investigated by Dc electrical conductivity and Hall coefficient measurements. $\text{Tl}_2\text{GaInSe}_4$ crystal was prepared by a special design based on Bridgman technique.

The conductivity, Hall mobility and carrier concentration of the $\text{Tl}_2\text{GaInSe}_4$ were investigated as a function of temperature. The Hall coefficient indicates that the $\text{Tl}_2\text{GaInSe}_4$ has the p-type conductivity. The values of the electrical conductivity, Hall coefficient, and carrier concentration and Hall mobility at room temperature were $1.826 \times 10^{-5} \Omega^{-1} \text{cm}^{-1}$, $13.3 \times 10^8 \text{ cm}^3/\text{C}$ and $4.7 \times 10^9 \text{ cm}^{-3}$ and $2.43 \times 10^4 \text{ cm}^2 \text{ v}^{-1} \text{ s}^{-1}$, respectively. The analysis of the temperature dependent electrical conductivity and carrier concentration reveal that the acceptor level is located at 0.33 eV above the valence band of $\text{Tl}_2\text{GaInSe}_4$.

The obtained electrical results indicate that the prepared $\text{Tl}_2\text{GaInSe}_4$ sample is a p-type semiconductor and it can be used for electronic device applications.

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