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Temperature Dependence of Galvanomagnetic Properties for Lightly Doped N-Type Si

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Abstract: The temperature dependence of Hall and magnetoresistance effects in n-type Si having a resistivity of 1400 $\{\Omega\}$ cm at room temperature is studied in the temperature range of 210-320 K. The variation of transverse magnetoresistance as a function of temperature is similar to the longitudinal magnetoresistance variation in $\langle 001 \rangle$ and $\langle 1\bar{1}0 \rangle$ n-Si the samples. It is observed that, in $\langle 001 \rangle$ sample, the transverse and longitudinal magnetoresistance variation is greater than that in the $\langle 1\bar{1}0 \rangle$ sample. In both samples, the temperature dependences of magnetoresistance is in accordance to double space anisotropy parameters. In both samples, the transverse and longitudinal magnetoresistance coefficients increase with increasing temperature in the temperature range 210-240 K and decrease with increasing temperature in the temperature range 240-320 K. The carrier concentration increases with increasing temperature and Hall mobility increases with temperature up to 260 K and decreases with increasing temperature above 260 K.

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