Measurement of positron mobility in silicon

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ERRATUM

Measurement of positron mobility in silicon by R I Simpson, M G Stewart, C D Beling and M Charlton (*J. Phys.: Condens. Matter* 1989 **1** L7251–7256)

In the above study the electric field in the depletion of the Au–Si–Al samples was calculated incorrectly leading to errors in the reported values of μ_+. The correct electric field distribution, derived from Laplace's equation (Sze 1981, Awcock and Young 1963), shows a linear variation across the region, with a maximum field at the Au–Si interface. Since the maximum drift length to the Au–Su interface is 10 μm the e^+ therefore experience a uniform field approximately equal to that at the interface.

Re-evaluation of the centroid data presented in the letter gives $\mu_+(295\ \mathrm{K}) = (68 \pm 1)$ $\mathrm{cm^2\,V^{-1}\,s^{-1}}$, and, using a fit to the Shockley expression for acoustic phonon limited carrier drift velocity, $\mu_+(104\ \mathrm{K}) = (370 + 80)\ \mathrm{cm^2\,V^{-1}\,s^{-1}}$. These results are in good agreement with a $T^{-1.5}$ extrapolation of the data reported by Mills and Pfeiffer (1977). The room temperature value is also in agreement with the estimate of μ_+ published recently by Corbel *et al* (1989).

A logarithmic fit of the current data and that of Mills and Pfeiffer (1977) gives a value for n, the temperature coefficient of e^+ mobility in Si, of 1.3 ± 0.1 which is somewhat less than the value of 1.5 expected from the charge carrier–acoustic phonon scattering model. A more detailed theoretical treatment of e^+ motion in Si would therefore be worthwhile.

References

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