salts leads to the hexagonal hexahydrates, the ferroelectric behavior of which has been reported by Holden, Matthias, Merz, and Remeika.[3]

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Resistivity Increase in Water-Quenched Gold*

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UPON quenching into water from a high temperature (650–950°C) an increase in the resistivity of gold wires (99.999% pure, 16 and 30 mil diameter) has been observed. The increase is describable by an equation of the form $\Delta\rho = Ae^{-E_F/kT}$, where $\Delta\rho$ is the increase in resistivity, A is a constant, T is the absolute temperature from which the quench is made, and E_F is the energy of formation of the defects responsible for the resistivity increase. It is found that $E_F = (1.02 \pm 0.06)$ ev, and that for a quench from 800°C, $\Delta\rho = 1.2 \times 10^{-8}$ ohm-cm. Sample results are shown in Fig. 1. All measurements were made at liquid-nitrogen temperature. The total time required to quench to room temperature ranged from 20 to 50 milliseconds.

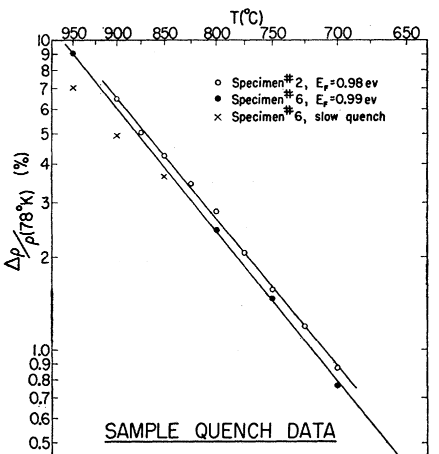

Fig. 1. The dependence of the quenched-in resistivity on the quenching temperature. Note that slow quenches indicated by × give points falling below the expected exponential dependence, particularly at high temperatures.

If too slow a quench is used, deviations occur at the higher temperatures as shown by the points marked × for specimen number 6. Experiments using other liquid quenching media indicate that the results are independent of the liquid used.

At least 90% of the quenched-in resistance anneals out at room temperature, and isothermal annealing measurements yield an energy of motion of (0.66 ± 0.06) ev for the defects. This agrees with the previous work of Kauffman and Koehler,[1] who reported a value of $E_M = (0.68 \pm 0.03)$ ev. The initial part of the annealing curve deviates somewhat from that for a second-order process. For a quench from 800°C with no deformation present, approximately 70 hours are required for half of the quenched-in resistance to anneal out at 30°C. Quenches involving small amounts of deformation from below 950°C give the same value of $\Delta\rho/\rho$ as those in which no deformation occurred. The rate of annealing and the energy of motion were, however, strongly affected by deformation. The rate increased on deformation by at least an order of magnitude and the apparent energy of motion was decreased in some cases to less than half the value found when deformation is not present. The annealing behavior was used as a sensitive test for any deformation which might occur during the quench.

Assuming that the defects involved are vacancies, the activation energy for self-diffusion in gold is found to be $Q = E_F + E_M = (1.68 \pm 0.12)$ ev, which compares favorably with $Q = 1.70$ ev found by Okkerse[2] using tracer techniques.

Further measurements on gold, and also on silver and copper are in progress.

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Mass of B^{13} from the Nuclear Reaction $Li^7(Li^7,p)B^{13}$

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IT has been predicted that the nuclear species $_5B^{13}$ will be found to be stable with respect to disintegration into heavy charged particles,[1] and Snell[2] has suggested that it may, by analogy with N^{17}, be a delayed-neutron emitter. The delayed neutrons have been searched for in fission and spallation fragments with negative results.[3,4] We have found that B^{13} may be prepared by means of the reaction $Li^7(Li^7,p)B^{13}$.

A 2-Mev Van de Graaff accelerator has been converted to the acceleration of Li ions, obtained by