Previously the absence of data for the low temperature expansion coefficient of Lucite prevented adequate correction for the contraction of this material. The present values are corrected for this effect.[4,5]

It is interesting to note that in carrying out a long series of measurements on nickel we obtained in one instance a transport rate curve characterized by a maximum of the type which has on occasion been reported not only for methyl methacrylate polymers,[3] but also for glass[6–8] and platinum.[9] However, on prior and subsequent runs a reproducibly different and more conventional rate-temperature variation was obtained. These rates, noted in the table, are substantially lower than those reported by Mendelssohn and White for a nickel beaker which had been "dipped into warm hydrochloric acid."[9] This is in general agreement with the previous observation that higher rates are obtained for etched metal surfaces.[1,2]

The results obtained for glass in this and other investigations,[7,10–12] when considered in conjunction with the known properties of glass surfaces,[13–15] suggest that a unique rate of transport over glass should not be expected.

Fused quartz (both transparent and translucent) was chosen as a source of data on vitreous materials other than glass. Data obtained by direct visual observation of transport using a clear quartz capillary were in excellent agreement with the results of electrical measurements.

Thorium fulfills the requirement of being a superconductor whose transition temperature is located in the region where the film transport rate is a slowly varying function of temperature. If there is an interaction between the film and the underlying surface which is altered by the onset of superconductivity, it might be expected to be most clearly distinguishable under such conditions. The zero-field transition temperature of our sample was determined by an induction method. The result, 1.38°K, is in good agreement with that of Shoenberg.[16] The transport data thus far obtained (on widely separate occasions) are characterized by an extreme height dependence and, in the region below about 1.4°K, by anomalously high scatter. Pending further investigation, the origin of this unusual behavior remains unexplained.

In conclusion we note that after suitable normalization at 1°K, the data cited above do not yield a universal curve for the temperature dependence of the transport rate.

* Assisted by the U. S. Office of Naval Research and Linde Air Products Company.
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Activity Assignment to Titanium 51

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(Received February 9, 1953)

TO the isotope Ti^{51} have been attributed three activities with half-lives 2.8 minutes,[1] 6 minutes,[2] and 72 days.[3] The first[2] and last of the above three activities have been removed. During a neutron irradiation a small amount of hafnium impurity in the titanium was shown chemically to be responsible for the 72-day activity.[4] The 6-minute activity has been confirmed[5] with slow neutron irradiation but not with chemical separations. Since there are serious obstacles in rapid titanium chemical separations, it was thought that a series of cross bombardments with appropriate particles and enriched isotopes[6] would be capable of removing any doubt as to the existence of a 6-minute activity attributable to Ti^{51}.

$Ca^{48}(\alpha, n)Ti^{51}$: Calcium carbonate, enriched in isotope of mass number 48 from normal abundance of 0.15 percent to 7.49, was bombarded with 20-Mev alpha-particles from the cyclotron. Since the abundance of Ca^{40} was still very high, 89.68 percent, the 3.9-hour Sc^{43} positron activity was so intense that decay readings were necessarily made in a magnetic spectrometer. Figure 1 shows the

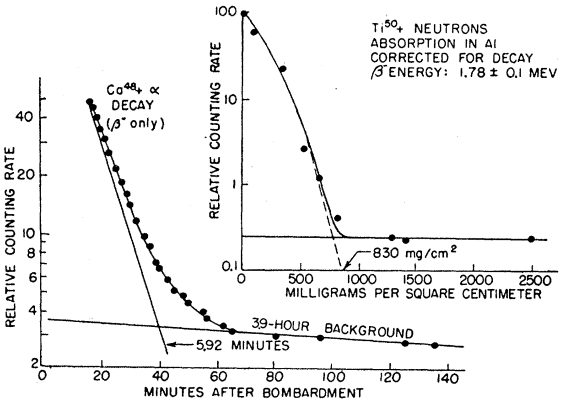

FIG. 1. Decay of Ti^{51} from $Ca^{48}+\alpha$ and absorption of negatrons of Ti^{51} from $Ti^{50}+n$.

half-life to be 5.92±0.15 minutes after the 3.9-hour annihilation background activity was subtracted.

$Ti^{50}(n, \gamma)Ti^{51}$: Titanium oxide enriched in isotope of mass number 50 from normal abundance of 5.34 percent to 84.69 was irradiated with neutrons slowed down in paraffin from a proton bombardment of beryllium. A half-life of 5.89±0.15 minutes was observed. Figure 1 also shows an absorption curve. The beta-energy was found to be 1.78±0.1 Mev which compares favorably with the two previous values of 1.6 Mev[7] and 2 Mev.[2]

A gamma-ray was evident in the Ti^{51} activity, although it was not specifically investigated here. The energy has been reported as 0.320 kev.[7]

$Cr^{54}(n, \alpha)Ti^{51}$: Chromium oxide, enriched in the isotope of mass number 54 from normal abundance of 2.30 percent to 83.1, was irradiated with fast neutrons. The 6-minute activity was again clearly observed. The presence of 3.7-minute activity V^{52} prevented an accurate half-life determination.

$V^{51}(n, p)Ti^{51}$: Vanadium metal when irradiated with fast neutrons yielded the 6-minute activity and again the interfering 3.7-minute activity.

From the four types of reactions, a consistent 6-minute activity was observed with an average half-life of 5.89±0.2 minutes, negatrons of energy 1.78±0.1 Mev, and a low energy gamma-ray. A definite assignment can be made to Ti^{51}.

It is a pleasure to acknowledge the support received through the Ohio State University Development Fund.

* Major, United States Air Force. Research under auspices of U. S. Air Force Institute of Technology, Wright-Patterson Air Force Base, Dayton, Ohio.
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