examination of the Perspex surface polished with a commercial liquid polish showed a rough streaky structure with "ridges" and "valleys" about 10^{-3} cm wide, while rouge polishing gave a comparatively smooth surface. The flow rates of curve *A* showed a considerably greater variation along the length of the beaker, than those of curve *C*, for a given temperature. Furthermore, the flow characteristics of rouge-polished Lucite and Perspex are very alike and have flatter maxima and are closer to the characteristic for glass.

These results, taken in conjunction with recent observations on the film flow out of specially polished stainless steel beakers,[2] seem to indicate that the observed flow on Lucite and Perspex can be regarded as being composed of two parts: (1) pure film flow giving a characteristic similar to the one observed on glass[3] (curve *D*); (2) a pressure dependent flow of bulk helium, which takes place when the surface irregularities are of a shape and size favorable to this type of siphon flow. The maxima in the flow characteristics would require this type of flow to decrease with decreasing temperature. It is interesting to note that a similar temperature dependence was observed in the case of flow of helium II through capillaries of about 10^{-2} cm diameter.[4] To verify this explanation, a flow experiment at 2.26°K, just above the λ-point, was done with a "rough" Perspex beaker carefully shielded from radiation, and a very small inflow was indeed observed. This flow was very strongly dependent on the difference of levels of helium outside and inside the beaker, increasing as the outer level was brought nearer the rim of the beaker with the inner level remaining constant. No such flow could be detected at 4.2°K. A detailed communication will appear shortly.

I wish to thank Dr. K. Mendelssohn for his guidance and many valuable discussions.

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Radioactivity in Neutron Activated Platinum

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In a previous report[1] some twenty-two electron conversion lines were noted from platinum irradiated in the pile. Since the spectrometric exposure was begun many hours after the end of the irradiation and only one spectrogram could be obtained from each specimen, it was naïvely concluded that all of the observed activity was associated with the 3.4-day decay of gold 199, formed from platinum 198. With stronger irradiated sources and shorter transit times, it becomes possible to make chemical separations and to obtain a sequence of exposures showing the different rates of decay for certain electron lines as shown in Fig. 1. It is apparent that lines characteristic of the 17.4-hour Pt^{197} activity are present. This electron group with work functions characteristic of gold, indicates the existence of two gamma-rays of energies 77.4 and 191.2 kev, as recently found in the *K*-capture decay of Hg^{197}. A chemical separation of gold from the platinum yields the electron lines shown in the bottom spectrogram of Fig. 1. The energies of the three gamma-rays, 49.8, 158.5, and 208.3 kev, agree well with values recently reported[2] by Hill.

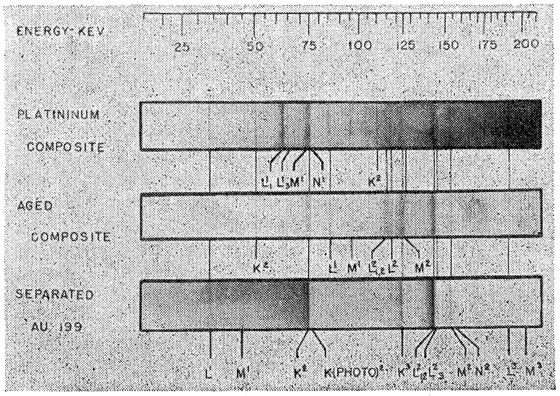

Fig. 1. Electron lines from freshly activated and aged platinum and separated gold.

Table I. Electron energies for composite platinum.

Electron energy	Interpretation	Energy sum	Electron energy	Interpretation	Energy sum
34.9 kev	*L* Hg	49.7 kev	110.5 kev	*K* Au	191.2 kev
46.3	*M* Hg	49.8	115.8	$L_{1,2}$ Pt	129.7
51.6	*K* Pt	130.0	118.2	L_3 Pt	129.8
53.2	Auger		125.3	*K* Hg	208.4
63.0	$L_{1,2}$ Au	77.4	126.9	*M* Pt	130.2
65.3	L_3 Au	77.2	129.1	*N* Pt	129.8
74.0	*M* Au	77.4	129.8	Photo *K* Pt	208.2
75.4	*K* Hg	158.5	144.3	$L_{1,2}$ Hg	158.5
76.8	*N* Au	77.6	146.4	L_3 Hg	158.7
77.8	Photo *K* Au	158.5	155.2	*M* Hg	158.7
80.2	Photo *K* Pt	158.6	157.7	*N* Hg	158.5
85.0	*L* Pt	98.9	193.4	*L* Hg	208.2
96.0	*M* Pt	99.3	204.6	*M* Hg	208.1

Table II. Gamma-energies.

Emitting isotope	Gamma energy, kev	*K/L* ratio
Au^{199}	49.8	
3.4-day	158.5	0.56; (*L/M*) 3.6
	208.3	4.5
Pt^{197}	77.4	
17.4-hour	191.2	6.0
Pt^{195m}	99.1	
4.4-day	129.8	0.1

Certain of the electron lines fall in neither of these groups and are associated with some other platinum activity. They decay with a half-life of the order of 4 days and appear to be satisfied by the work functions of platinum. It is, therefore, quite probable that no 4.4-day radioactivity exists in platinum 193 as had been assumed, but rather that an isomeric state exists, probably in platinum 195, since this mass could equally well satisfy every criterion used[3] in making the previous assignment. The gamma-energies of 99.1 and 129.8 kev are identical in value with those observed[4] after the beta-decay of a 180-day activity believed to be in Au^{195}. The relative intensity of the two gamma-rays, here found to be about equal, is quite different from that reported for the gold. This might be expected since in the latter case the beta-emission is complex so that about 90 percent of the beta-decays yield no 129.8-kev gamma-ray.

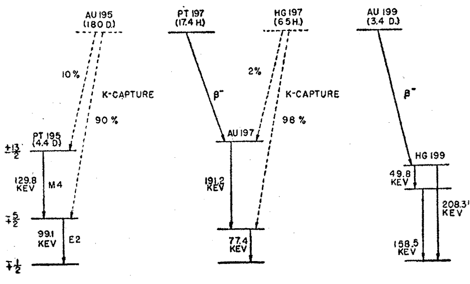

Fig. 2. Proposed nuclear levels in Pt^{195}, Au^{197}, and Hg^{199}.

The electron energies and their interpretations are shown in Table I, while the gamma-energies are tabulated in Table II. By the use of a recording microphotometer the densities of the photographic plates, and hence, the relative intensities have been found for certain of the lines as shown in Table II. By utilizing the data and tables as presented[5] by Goldhaber and Sunyar, the multipolarity of certain of the transitions appears to be as shown in Fig. 2. One unusual feature of the 129.8-kev isomeric transition seems to be that the intensity of the L_3 conversion is about equal to that for the L_1 line.

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Electrolysis of Thorium Oxide*

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THE electrolysis of homogeneous crystalline thorium oxide at elevated temperatures is being studied. Fused material obtained from the Norton Company is red when received and will bleach when heated in vacuum or hydrogen. The red color can be restored by heating in oxygen and, under certain circumstances, by radiation.

Optically clear specimens are cut with a diamond saw, ground and polished, and are mounted in a vacuum furnace in such a manner that visual observation is possible during passage of current. Preliminary studies have been made with tungsten electrodes and with molybdenum electrodes, the results being the same in both cases.

When a current of 100 ma/cm^2 is passed at a temperature of 1300°C, a darkening of the crystal is observed to form at the cathode end and to proceed toward the anode at a rate of approximately one mm per second. The crystal in the photograph is 10 mm long. After 7 seconds with 100 ma/cm^2 (and a field strength of about 50 v/cm) the dark region extends approximately 7 mm from the cathode end. Attention is drawn to the appearance of a metallic deposit on the crystal surface at the cathode end.

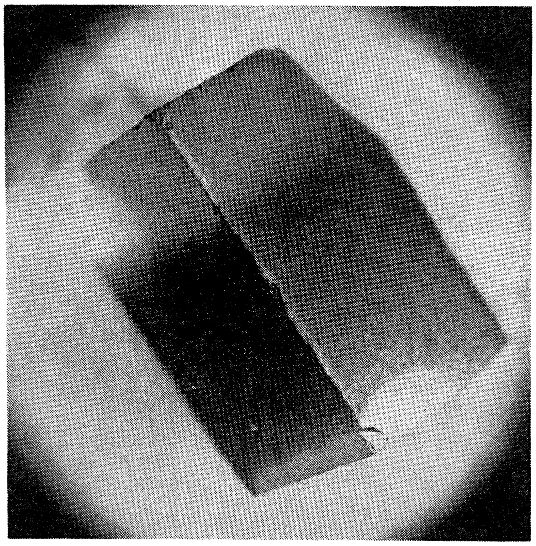

FIG. 1. A crystal of thorium oxide in an early stage of electrolysis.

When the drawing of current is continued the crystal becomes uniformly jet black and the metallic surface layer (presumably thorium) increases in area until it reaches the anode. This establishes an effective short circuit and electrolysis ceases.

If, starting with a specimen which has become completely covered with a metallic layer, one removes the layer by grinding, repolishes the crystal, and, subjects it to 1300°C for an hour or so, the black material diffuses to the surface and a metallic layer is again formed. It would appear, therefore, that the darkening is here associated with a stoichiometric excess of the metal, dispersed as ions, or possibly to some extent coagulated.

The particles responsible for the darkening are evidently charged since reversing the polarity of the applied field reverses the direction of motion of the dark region. However, wherever the dark region has reached the surface, a permanent discoloration remains. The charge responsible for the mobility appears to be neutralized (e.g., by stray electrons from outside) when the charge reaches the surface.

Certain evidence has led us to believe that the amount of thorium electrolyzed in the crystal in the photograph is not less than 10^{-2} mg. This is the result of the passage of 0.35 coulomb. If all the current were contributing to electrolysis, the quantity of thorium oxide electrolyzed by 0.35 coulomb would be 0.4 mg. This would indicate that, in single crystals, the fraction of current resulting in electrolysis is of the order of 10^{-2}.

It is of interest to compare the above result with that obtained from studies using finely divided thorium oxide. Measurements of the rate of disappearence of coated and sintered thoria cathodes show that the fraction of current producing electrolysis may be as low as 10^{-6}. The discrepancy may possibly be explained by a much higher electronic conduction in the activated cathodes than was present in the single crystals. It is also possible, however, that the large surface of the finely divided material plays an important part. The conductivity of the mass of particles may be of essentially different nature than that of a single crystal. Electrons in the surface region may possess higher mobility than in the interior. also it seems inescapable that metallic thorium will be liberated in the individual grains and migrate to their surfaces, giving rise to an even more involved electronic conductivity mechanism.

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Alpha-Particles from the Li^7+T Reactions

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THE interaction of tritons with Li^7[1] may lead to the following exothermic reactions:

$$Li^7+T\rightarrow He^6+He^4+9.79 \text{ Mev}, \quad (1)$$

$$Li^7+T\rightarrow He^4+He^4+n+n+8.85 \text{ Mev}, \quad (2)$$

$$Li^7+T\rightarrow Be^9+n+10.43 \text{ Mev}. \quad (3)$$

In addition, reaction (2) may proceed as a two-step process via the formation of the unstable nuclei Be^8 or He^5. This letter discusses the energy distribution of the α-particles from the first two reactions and reports evidence for a new excited state of He^6.

Hydrogen, 15 percent tritium, was accelerated to 240 kev and the mass-three beam magnetically selected to bombard a $Li_2{}^7SO_4$ target.[2] The charged particles emitted at 90° to the beam were studied with a 90° magnetic analyzer by the technique previously reported[3] and also with a large proportional counter. This counter consisted of a dural cylinder 5 inches in diameter and 15 inches long provided with a side window of mica 1 mg per cm^2 thick. The inner conductor was a 0.010-inch diameter tungsten wire which passed through glass insulators supported by guard rings at each end. The counter was filled with A containing 1 percent CO_2 to a pressure of 70 cm of mercury and was usually operated at 2400 volts. The gas multiplication was about five. Under these

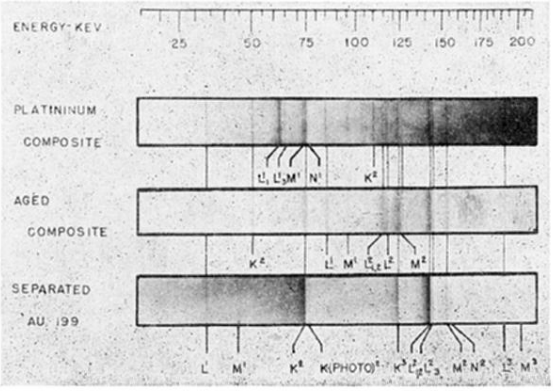

FIG. 1. Electron lines from freshly activated and aged platinum and separated gold.