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FURTHER PRODUCTION OF TRANSCURIUM NUCLIDES BY NEUTRON IRRADIATION

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FURTHER PRODUCTION OF TRANSCURIUM NUCLIDES
BY NEUTRON IRRADIATION

Bernard G. Harvey, Stanley G. Thompson, Albert Ghiorso,
and Gregory R. Choppin

January 11, 1954

Berkeley, California

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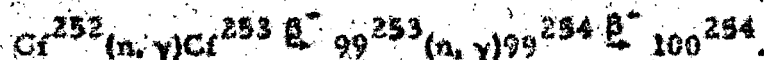
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and Gregory R. Choppin
Radiation Laboratory and Department of Chemistry
University of California, Berkeley, California

January 11, 1954

In a continuation of the work previously reported¹ we have succeeded in producing and chemically identifying an isotope of the element with atomic number 100 through neutron irradiation of the heavy californium isotopes in the Materials Testing Reactor. The method of chemical isolation consisted of precipitation and ion-exchange procedures¹ and the atomic number identification depends on the position in the elution sequence in the ion exchange adsorption-elution method of separation of the actinide elements.

Alpha particles of roughly 7.2 Mev energy and about 3 hours half-life were found in the ion exchange column fraction corresponding to the eka-erbium position immediately preceding the 6.6 Mev alpha particles¹ due to element 99 which eluted in the eka-holmium position immediately preceding the californium alpha activity.¹ Although the amount of activity was small, the identification of atomic number is regarded as definite.

The isotope of element 100 emitting the approximately 7.2 Mev alpha particles is tentatively assigned³ as ${}_{100}^{254}$ and a possible reaction sequence leading to its production might be the following:



Due to the existence of unpublished information on element 100 the question of its first preparation should not be prejudged on the basis of this paper.

It is a pleasure to acknowledge that this work was accomplished with the helpful guidance of Professor Glenn T. Seaborg. Special thanks are due to Almon E. Larch for his valuable assistance with some of the measurements. We wish to acknowledge the help of Dr. W. B. Lewis and the entire Phillips MTR staff for aid in the irradiation of the sample. The continued interest and encouragement of Professor Ernest O. Lawrence and the Atomic Energy Commission, is gratefully acknowledged.

¹ S. G. Thompson, A. Ghiorso, B. G. Harvey, and G. R. Choppin, Phys. Rev., in press.

² See, e.g., G. T. Seaborg, Chapter 17, Plutonium Project Record, Vol. 14A of the National Nuclear Energy Series (edited by G. T. Seaborg and J. J. Katz, McGraw-Hill Book Co., Inc., New York, January 1954).

³ G. T. Seaborg, University of California Radiation Laboratory Report UCRL-1942 (March 1952). (Ohio State University Third Annual Phi Lambda Upsilon Lecture Series.)