Collisions of Alpha-Particles with Chlorine Nuclei

The cloud tracks of about 700,000 thorium (C+C′) alpha-particles have been photographed with a stereoscopic camera. A large-diameter cloud chamber filled with methyl-chloride and helium was used. In addition to the range and velocity measurements obtained for carbon recoil nuclei,[1] forty-one selected forks ascribed to collisions of alpha-particles with chlorine nuclei have been analyzed, the results of which are presented here in Fig. 1. The analysis was carried out with the same procedure as that used for the carbon collisions by one of us (G. A. W.), the value 36 for the atomic weight of chlorine being used throughout.

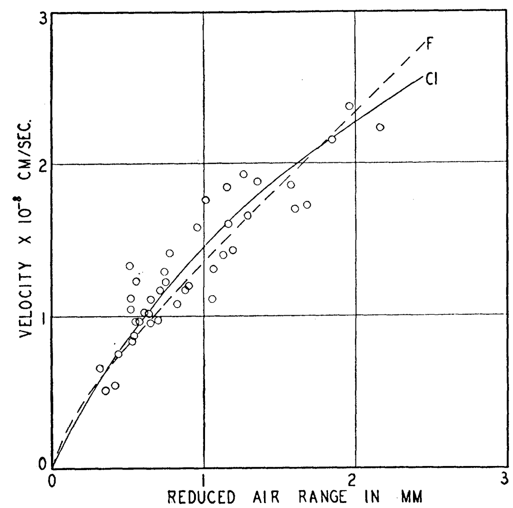

FIG. 1. Range-velocity curve for chlorine recoil atoms in methyl-chloride and helium.

The range-velocity curve for recoil fluorine nuclei as obtained by Feather[2] is included for comparison (broken curve). No outstanding similarity is observed in the shape of the fluorine and chlorine curves for the region of recoil ranges considered, although such might have been expected from Anthony's[3] observations. The range-velocity curve for chlorine obtained from that for fluorine by the empirical relation given by Blackett and Lees[4] gives poor agreement with the present results.

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[1] G. A. Wrenshall, to appear soon in the *Physical Review*.
[2] N. Feather, Proc. Roy. Soc. **A141**, 194–209 (1933).
[3] R. L. Anthony, Phys. Rev. [2] **50**, 726–732 (1936).
[4] P. M. S. Blackett and D. S. Lees, Proc. Roy. Soc. **A134**, 658–671 (1932).

A New Radioactive Isotope of Masurium, $_{43}Ma^{101}$*

An accurate study of the 24-min. period produced in molybdenum by bombardment with slow neutrons made it clear that this period should be analyzed into two. This point was first noticed in a very short exposure, in which the decay curve showed a distinct convex curvature.

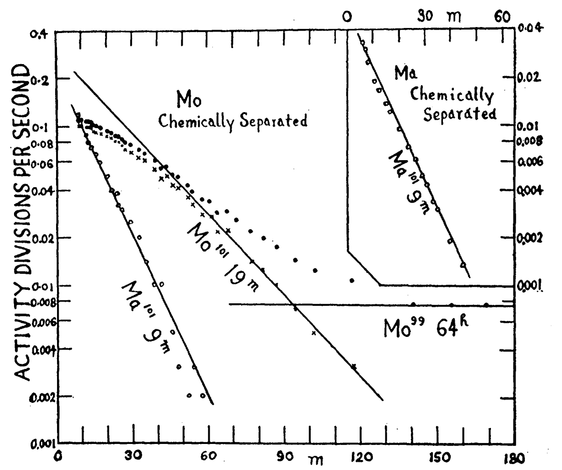

FIG. 1. The decay curves obtained for the chemically separated masurium and molybdenum fractions.

A very quick chemical separation of the molybdenum sample into the masurium fraction and the molybdenum fraction after a slow neutron bombardment, enabled us to find a new masurium isotope, Ma^{101} which emits β-rays of about 1.14×10^6 ev in energy (K-U upper limit) with a half-life of 9 ± 1 min., while the mother isotope Mo^{101} decays with a half-life of 19 ± 1 min. emitting β-rays of 1.78×10^6 ev in energy. The decay curves for the chemically separated molybdenum and masurium fractions are given in Fig. 1.

Another masurium isotope Ma^{99} has been found by Seaborg and Segrè,[1] the half-life of which is 6 hours but it emits very soft β-rays.[2,3] For the investigation of some special chemical nature of masurium, it would be much more convenient to use Ma^{101} rather than Ma^{99} because it is produced very strongly by bombardment with slow neutrons and also it emits energetic β-rays.

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[1] G. T. Seaborg and E. Segrè, Phys. Rev. **55**, 808 (1939).
[2] By bombardment with protons, four periods, 0.5 min., 31 min., 53 min. and 110 hr. have been found, but not much has been reported yet. Du Bridge, Barnes, Buck and Strain, Phys. Rev. **53**, 447 (1938); Sherr, Henderson, White, Delsasso and Ridenour, Phys. Rev. **53**, 946 (1938); Ewing, Perry and McCreary, Phys. Rev. **59**, 1136 (1939).
[3] By bombardment with deuterons, several long periods have been reported. C. Perrier and E. Segrè, J. Chem. Phys. **5**, 712 (1937); Nature **140**, 193 (1937); B. N. Cacciapuoti and E. Segrè, Phys. Rev. **52**, 1252 (1937); B. N. Cacciapuoti, Phys. Rev. **55**, 110 (1938).