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 COMMUNICATIONS TO THE EDITOR
 

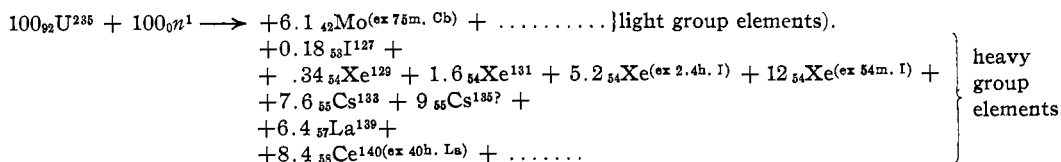
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## THE INSTABILITY OF SILVER PERCHLORATE

Sir:

Silver perchlorate was lately (October, 1938) prepared for an electrochemical experiment in the following manner. Purified silver oxide was treated with an equivalent amount of a good grade of 60% perchloric acid. The neutral solution was evaporated to the appearance of crystals, cooled, and filtered. The salt was recrystallized twice from dry benzene and stored for fifteen hours in a desiccator held at 10 mm. pressure. The resulting salt was superficially dry, but caked. While breaking the cakes by gentle pressure in a mortar, a sample detonated with extraordinary violence. Other portions withstood this treatment, and were unaffected by flying debris from the exploded sample.

The detonation involved the benzene addition compound of silver perchlorate, the occurrence of which has been reported.<sup>1</sup> Investigations<sup>1,2,3</sup> of the systems, silver perchlorate-organic solvent-water, have been completed successfully, and these frequently involved manipulation at rather extreme conditions of temperature. The author has recently learned<sup>4</sup> of an explosion, under nearly identical circumstances, involving the ethyl alcohol addition compound of silver perchlorate, which occurred in connection with some further



work attempted by the investigators whose articles are cited. In the course of these unpublished investigations, it was also found that under some circumstances, violent decomposition of perchlorates dissolved in organic solvents may take place.

In view of these various experiences, the author is impressed by the unpredictable nature of the instability of silver perchlorate. Until the nature

- (1) Hill, *THIS JOURNAL*, **44**, 1163 (1922).
- (2) Hill and Macy, *ibid.*, **46**, 1132 (1924).
- (3) Hill, *ibid.*, **47**, 2702 (1925).
- (4) Ricci, private communication.

of the conditions affecting the violent decomposition of perchlorates is known, it is evident that investigations involving these substances must be attended by extreme caution.

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## THE EQUATION OF URANIUM-235 FISSION

Sir:

Although substantial qualitative information is now available on the chemical elements produced by the slow neutron induced fission of U<sup>235</sup>, practically no data on the quantities of each element produced are available.

In a joint investigation with E. Fermi and H. L. Anderson an attempt has been made to fill this gap.

The known fission products fall into two groups: a *heavy* group with atomic weights from about 125-150 and a *light* group with weights ranging from about 80-100. At first effort was concentrated on the elements of the heavy fission group and the fission probabilities of nine of twelve known fission series determined.

The present results may be expressed in the form of a *fission equation*:

In those cases where the atomic weight of the individual stable isotope is as yet unknown the element has been characterized by the half period (h. = hours, m. = minutes) of its parent substance.

As can be seen this equation is as yet incomplete, for the fission of 100 atoms of U<sup>235</sup> will produce 100 atoms of elements of the heavy group and simultaneously 100 atoms of the light element group (in addition to neutrons and energy). It indicates that the discovery of additional fission fragments is to be expected.