PHYSICS

California Physicists Split U-235 Into Equal Parts

High-Speed Neutrons of 16 Million Electron Volts Used for Fission; Got Energies of 100 Million Volts

BY SHOOTING high energy atomic bullets, or neutrons, at them, University of California physicists have succeeded in breaking the nuclei of both uranium and thorium atoms into equal parts. Importance of this is that the form of uranium used is of mass 235, the kind that, it is hoped, will make possible practicable atomic power with such a splitting or fission process.

In previous experiments, by using slow-speed neutrons, uranium was divided very unevenly, into a light element and a heavy one.

However, Dr. Emilio Segre, of the University's Radiation Laboratory, and Dr. Glenn Seaborg, instructor in chemistry, used high-speed neutrons, with energies of 16 million electron volts, or more than three times that used earlier. These neutrons are produced by bombarding atoms in the cyclotron, or "atom-smasher."

In the splitting process, energies of 100 million or more volts are produced. Difficulty of separating uranium of mass 235 from the ordinary kind, which contains it in rather small amounts, has so far prevented actual tests of uranium power.

Science News Letter, March 15, 1941

PHYSICS

Radioactive Substances Made With California Atom-Smasher

Germanium, Element Similar to Lead, Used in New Experiments; One of Last of Elements Studied

FOUR new artificial radioactive substances have been added to those known to man, bringing the known total to about 360, it is announced by three University of California scientists.

An artificial radioactive substance is one which is made to emit rays somewhat as radium does. They are made by smashing atoms in the Berkeley cyclotron. When the atom of an element is smashed it often changes into another element and emits rays which can be detected by the use of sensitive instruments.

Four radioactive specimens of germanium, an element similar to lead, were reported by the California scientists. Germanium is one of the last of the 92 elements to be investigated in detail for radioactive species.

More than 100 of the known artificial radioactive substances have been discovered at the University of California with Prof. Ernest O. Lawrence's cyclotron.

Some of the radioactive elements have proved invaluable in medical and biological research. Radio phosphorus is being used in experiments on the treatment of leukemia, the dread disease of the blood cells. The growth of teeth and bones is being studied by the use of radioactive strontium, radioactive iodine is revealing valuable facts about the thyroid gland, and several other elements treated by the cyclotron are literally throwing new light on biological processes.

Plant growth and nutrition are being studied also by feeding a solution of radioactive elements and following their course through roots, stems and leaves. The use and value of various basic food elements are being studied in animal and poultry nutrition with "tagged" substances.

The four radioactive germanium species were reported by Dr. Glenn T. Seaborg, instructor in chemistry, Dr. J. J. Livingood, former research associate in the Radiation Laboratory, and Gerhart Friedlander, graduate student in chemistry.

Science News Letter, March 15, 1941

CHEMISTRY

Colors of Thin Films Used to Detect Viruses

DIAGNOSING disease may in future be aided by a new method which makes use of the changes of iridescent colors reflected from very thin films of transparent material.

Details of the new method which is expected to detect viruses, toxins, poisons and other tiny and invisible substances were explained in an announcement that a patent covering the method had been issued to Dr. Irving Langmuir, of the General Electric Research Laboratory.

Thin films of transparent material such as barium stearate, an insoluble soap, reflect iridescent colors, it is known. The color depends on the thickness of the film. A film with a thickness of 47/10,000,000 of an inch reflects a purple color when illuminated by a white light. If the film is made slightly thicker the color changes toward blue. The changes in thickness can thus be measured by observing the changes in color.

To detect viruses or other tiny, invisible substances, slides are first conditioned by applying the thin barium stearate film and then dipping in a 1% solution of thorium nitrate. Then it is possible to apply to the slide a substance that has a specific reaction toward the particular toxin or virus or poison or other substance for which the test is to be made.

If the suspected substance is present in the solution tested, adsorption of a single layer of uniformly thick atoms or molecules of the substance will take place on the slide surface, producing an increase in film thickness and a corresponding change in color.

Each type of substance in solution is expected to produce a characteristic increase in film thickness and corresponding change in color of the conditioned slide. Once these characteristic thicknesses and colors for known substances have been determined, identification of suspected substances will be a matter of check and comparison. Dr. Katharine B. Blodgett and Vincent J. Schaefer of the Research Laboratory staff have assisted Dr. Langmuir in the investigations, which started in 1935.

Science News Letter, March 15, 1941