PHYSICS-CHEMISTRY

Latest Nobel Awards

Dr. Isidor Rabi received the 1944 physics award, and Dr. Otto Stern was awarded the 1943 prize for their atomic research; Prof. Georg von Hevesy Chemistry Nobelist.

➤ DISCOVERING secrets of the atom's heart has won Nobel prizes for two physicists in America. Dr. Isidor I. Rabi, of Columbia University, received the 1944 Nobel award in physics for discovering radiations, emitted by atoms, that have lower pitch than any hitherto observed and devising his magnetic resonance method for measuring them. The 1943 prize in physics was given to Dr. Otto Stern, of Carnegie Institute of Technology, for investigating the structure of the atom by means of the "molecular beam" method.

Dr. Rabi found that atoms act like little radio transmitters broadcasting on ultra-short waves. Their radiations are pitched lower than any previously recorded, but he was successful in devising a method of measuring them.

Dr. Rabi's work opened a way of measuring such subtle properties of atoms and molecules as the magnetism of their component parts, a hundred times more accurately than was possible by any available instrument. Of special significance is his conclusion that "there are no forces between the nucleus and the electrons because of their spins, other than those arising from the fact that the nucleus as well as the electron, is a magnet."

Huge batteries salvaged from obsolete Navy submarines were used by Dr. Rabi and his associates at Columbia University in scientific experiments testing theories concerning the "spin" of electrons in the atom.

Dr. Stern investigated the structure of the atom by means of the "molecular beam" method which he and his collaborators at the Universities of Frankfort and Hamburg developed. Leaving Germany because of Nazi oppression, he continued his research at the Carnegie Institute of Technology where a $25,000 grant from the Buhl Foundation in 1934 established a laboratory for him.

In the molecular beam method of physical experimentation, a gas from the element under study is passed through a fine hole into a chamber where a high vacuum is constantly maintained. Due to the high vacuum, no collisions between the molecules occur and each molecule travels in a straight line. By a series of fine slits the direction of the molecules is controlled and a fine beam is cut out. This is the "molecular beam."

By directing the beam through the region of a magnetic field some of the atoms are deflected from the straight course, and a measurement of the deflection has enabled the physicist to calculate the magnetic moment of the atom—the magnetic force required to deflect them from a straight path.

By applying these studies and also those they have made in wave properties of matter, Prof. Stern and his collaborators have discovered many facts about the structure of the atom.

A desire to engage in intensive studies relative to the use of X-rays on cancer, using the award coming to him as a Nobel prize winner, was expressed, it is reported, by Prof. Georg von Hevesy upon the receipt of the notification. This 59-year-old professor of the Danish Institute of Theoretical Physics, Copenhagen, since 1943 a war refugee living near Stockholm, received the 1943 chemistry award for his work in the use of isotopes as indicators in studying chemical properties.

Among notable studies of Prof. Hevesy was one relative to how the muscle substance, known as creatine phosphoric acid, breaks down during muscular exercises, and how it is rebuilt or rejuvenated in the resting muscle. In this study he used atoms of sodium phosphate labelled by making them artificially radioactive so that no matter where they might be their presence would be detected by the radiations they produced.

Some of the labelled sodium phosphate was injected in frogs, and then, at various time intervals, creatine phosphoric acid was extracted from the muscle. The replacement of the phosphorus atoms could thus be traced.

Heavy water was found by scientists to slow down the life processes in mice and other animals and was thought dangerous for human beings. However, Prof. Hevesy, while a professor at Freiburg, Germany, took very small quantities, not to test the possible poisonousness, but to use the double-weight hydrogen atoms as tracers in order to discover how long water remains in the human body. The water he drank contained 0.46% of heavy water. No harmful effects were reported.

The 1944 chemical prize will probably not be awarded until next year.

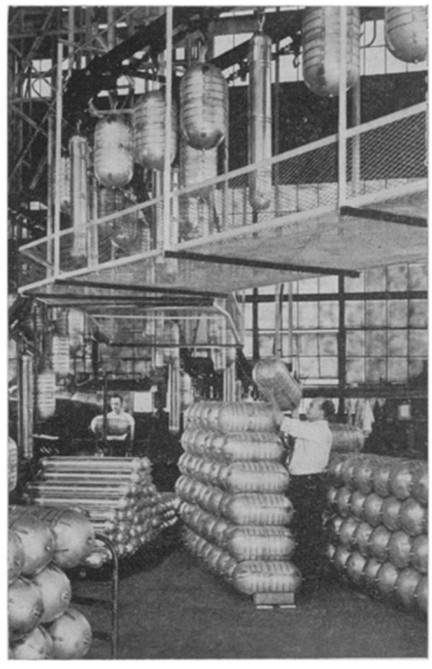
Science News Letter, November 18, 1944

CHEMISTRY

Sodium Bentonite Used for Clearing Turbid Water

➤ A SCIENTIST on the faculty of the State University of Iowa, Prof. Hubert L. Olin, has taken out patent 2,362,022 on a new process for clearing water of the silt that makes it turbid. He uses sodium bentonite, an exceedingly fine-particled clay that has the property of swelling immensely when wet, and in that state captures the small particles of silica that constitute silt. The treatment has proved effective with bentonite additions on the order of 17 to 75 parts per million of water, sometimes used in combination with alum and lime.

Science News Letter, November 18, 1944



WILL NOT EXPLODE — These stainless steel oxygen cylinders will not explode even when pierced by a 20-millimeter shell. The man in the foreground in this Firestone Steel Products Company assembly room, is stacking the type of cylinder used on the B-29 Superfortress.