CHEMISTRY

See How Atoms Tie Up

Neutron beam technique permits the photographing of the pattern produced by a stream of neutrons when they scattered by passing through an ice-crystal.

➤ FOR THE FIRST TIME scientists have actually been able to see how hydrogen atoms tie up to the oxygen atoms in a piece of ice.

Drs. E. O. Wollan, C. G. Shull and W. L. Davidson of the Oak Ridge National Laboratory in Oak Ridge, Tenn., have found that hydrogen atoms are not stay-at-homes, fixed in one position, as proposed by some scientists. Instead, the hydrogen atoms are restlessly jumping from one position to another in the crystal structure of ice.

A method of locating the tiny hydrogen atom in a crystal was described by Drs. Wollan and Shull at the International Congress of Crystallography at Harvard University. Since hydrogen is present in all of our foods, fuel, clothing, and many other materials, such studies are of great potential importance.

The Oak Ridge scientists photographed the pattern produced by a stream of neutrons, the particles which trigger an atomic bomb, when they have been scattered by passing through an ice-crystal. The pattern is like a shadow picture of the atomic structure of the crystal. It can give scientists a great deal of information about the internal make-up of the material through which the neutrons have just passed. A wide variety of other substances in addition to ice have been studied by the neutron beam technique.

Many times in the past the patterns formed by streams of electrons and X-rays have been photographed but neutrons act very differently and their patterns give a new view of crystal structure.

Production of diffraction patterns with neutrons is much more difficult than getting the patterns with electrons and X-rays. Only recently has this feat been accomplished with neutrons from the chain-reacting pile at Oak Ridge.

Science News Letter, August 7, 1948

CHEMISTRY

Dyes Close to Explosives

➤ REPORTS from Ludwigshafen, Germany, that the destructive explosions, which wrecked the chemical plant of the I. G. Farben works, came from the methyl violet factory serve to remind the world of the close connection between dyes and explosives. They are made from the same coal-tar chemicals. One of the reasons for Germany's great development of the coal-tar dye industry before World War I was her interest in developing the explosives industry at the same time.

The dual nature of the element nitrogen, at once the safest and the most dangerous of the common elements on which life depends, is responsible for this latest chemical disaster, as it was in the case of the ammonium nitrate explosions at Texas City last year and at Oppau, Germany, some 20 years earlier. The present explosion, however, was not due to ammonium nitrate, a supposedly safe material. Methyl violet, the dye chemical reported to be the cause of the Ludwigshafen explosion, belongs to a class of compounds known to be chemically unstable. Methyl violet belongs to the class of triphenyl methane dyes in which three nitrogen atoms are combined in each molecule with a quantity of carbon and hydrogen. It is a distant relative of the explosive T. N. T. In any such compound, given the right conditions, the normally mild and inert nitrogen may suddenly change partners and the result may be an explosion.

The true chemical explosion occurs when an unstable substance changes into a more stable one, giving off heat as it does so. The products are usually gases, and the heat given off by the explosion puffs them out into a larger volume, wrecking anything solid that may be in the way. In the accounts from Ludwigshafen, one explosion after another seemed to have been set off in this way, so that the result was a sort of "chain reaction." After such a conflagration is once started, the intense heat may continue to make materials not normally explosive vaporize suddenly with results as disastrous as those of the deadliest nitrogen compounds. There is a report that rocket fuels, with their high oxygen content, were among the products of this plant. If so, these would add to the fierceness of the flames.

Science News Letter, August 7, 1948

CHEMISTRY

Selenium Produced in New Fibrous "Wool" Form

➤ THE "MOON ELEMENT," selenium, used in electric current rectifiers and photocells, is produced in a new fibrous form similar to glass wool by a process on which an English inventor, D. L. A. Driver of London, has been granted patent 2,445,768. The molten selenium is sprayed through a series of nozzles into a chamber, where it forms a felted mat of "wool" on a moving belt. This mat can be rolled for storage, or immediately cut into disks for use in rectifiers or photocells. Rights in the patent are assigned to Standard Telephone and Cables, Ltd.

Science News Letter, August 7, 1948

Science Service Radio

➤ LISTEN in to a discussion on mental health for the world on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p. m. EDST Saturday, Aug. 14. Watson Davis, director of Science Service, will have as his guests two of the leaders of the International Congress on Mental Health, to be held in London Aug. 11 to 21. They are Dr. John R. Rees of London, President of the International Committee for Mental Hygiene and organizing chairman of the congress, and Dr. Lawrence K. Frank of Ashland, N. H., Chairman of the International Preparatory Commission.

Science News Letter, August 7, 1948