CHEMISTRY

Atoms Ionized Then Sorted

A new method of sorting atoms is expected to become a valuable aid in the analysis of organic molecules such as deoxyribonucleic acid.

➤ A CHAIN of 100 tiny craters dug by electric sparks in an area about as thick as a single human hair is providing science with a new technique for sorting atoms.

Atoms dug from the craters—about one billion from each hole—are ionized and passed through a magnetic field that puts them into circular orbits. The heavier ions are flung outward farther than the lighter ones and strike at different points on a photographic film. The position and darkness of the lines show what atoms are present and how abundant they are.

The new technique, developed at the Westinghouse Research Laboratories in Pittsburgh, features a spinning plate, placed less than one-thousandth of an inch from a gold-tipped electrode. Material to be analyzed rests on the plate.

The basic instrument for doing this atomic sorting is called a mass spectrograph. The new sampling technique greatly enhances the usefulness of the instrument for microchemical analysis in such areas as thin-film research, surface chemistry and biochemistry.

The new mass spectrograph technique was developed by W. M. Hickam and G. G. Sweeney of the laboratories' physical chemistry department. One of its main advantages is its distinct improvement over previous mass spectrograph methods for the analysis of organic molecules.

According to the research scientists, the technique is expected to be especially valuable in the analysis of organic molecules, such as deoxyribonucleic acid, or DNA, the "molecule of life." The reason big things are expected from the new method is that the spinning plate constantly brings new clean material into the spark and the speed of vaporization lessens the chance of overheating and chemical change.

• Science News Letter, 88:34 July 17, 1965

PHYSICS

Tiny Bubbles in Gas 'Bounce' With Heat

➤ MICROSCOPIC gas bubbles in mineral fluids "bounce" when there is a fantastically small change of temperature.

The presence of a cool needle or the shadow of a finger coming between the bubble and the warm light of the microscope will make these tiny bubbles hop to the edge of the liquid, Dr. Edwin Roedder, research geologist with the U. S. Geological Survey, told the Geological Society of Washington.

With a temperature gradient of perhaps one-millionth of a degree Fahrenheit, a micro-vapor-bubble encased in a tiny amount of mineral fluid will hop to the side and stay there. The smaller the bubbles, the faster they hop.

As yet the scientists do not know why they hop. One explanation may be surface diffusion, Dr. Roedder said.

• Science News Letter, 88:34 July 17, 1965

BIOTECHNOLOGY

In Future, Electricity May Come From Sewage

➤ ELECTRICITY for the home may one day spark from the community sewage plant.

Waste disposal could be turned into an asset by getting electricity from the sewage at the same time it is disposed of, J. Brake, B. Towson and H. Silverman, Magna Corporation, Santa Fe Springs, Calif., reported.

The use of microorganisms to produce electrical power is a very recent development in man's search for new sources of power. Biological electrical energy has attracted quite a bit of attention, since the necessary fuels are all natural products, including plants and waste products.

It is a well known fact that most living things generate some electricity, but in most cases the amount produced is so weak that it can be detected only by very sensitive instruments.

Microorganisms, which obtain nutrients from the ocean, could one day be used to help power long-life devices such as beacons at sea. Biochemical fuel cells could operate long-lasting radio transmitters hidden behind enemy lines. Electrochemical measurements could be important in detecting and counting bacteria in water supplies and food products such as milk and frozen foods.

In addition, such energy may be used to power electrical devices in space and to produce electricity for ourselves and energy-poor nations.

The researchers described a new three-cell battery, powered by microorganisms that live on coconut juice, capable of running a transistor radio.

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CHEMISTRY

Cast Iron Improved By Cutting Sulfur Content

➤ CAST IRON has been made into a stronger, cheaper and more flexible material by reducing the amount of sulfur in it.

Researchers at Purdue University, Lafayette, Ind., have found a way to decrease the sulfur content to less than two parts per million without adding magnesium, once believed to be the key element in improving cast iron.

Tiny pieces of graphite shaped like corn flakes are sprinkled throughout gray cast iron. If processed so that as much sulfur as possible is extracted from the raw materials, the graphite flakes become almost perfect spheres. The result is ductile cast iron that has great tensile strength and properties resembling those of steel.

• Science News Letter, 88:34 July 17, 1965

Goodyear

INSIDE A MAMMOTH MOTOR—Nearly 20,000 pounds of rubber insulation fabricated by Goodyear were installed inside the huge solid fuel rocket motor at the Aerojet-General test site in Florida. The motor is about 23 feet in diameter and 80 feet long.