

Rare Astatine Probed

Radioactive astatine, the heaviest element of the halogen family, is two million times as radioactive as radium

► DIRECT MEASUREMENTS of the chemical properties of astatine, a highly radioactive element that has never been seen with the human eye, have been made successfully for the first time.

Astatine, element number 85, is the heaviest member of a family of chemical elements called the halogens. Besides astatine, this family includes the more familiar elements fluorine, chlorine, bromine and iodine.

These substances have many common properties, among them the tendency to form simple salts with metals. Chlorine forms sodium chloride, our common table salt.

Drs. Evan H. Appleman, Eric N. Sloth and Martin H. Studier, scientists at the Atomic Energy Commission's Argonne National Laboratory near Chicago, reported their research in *Inorganic Chemistry*, May 1966.

They prepared chemical compounds from samples of astatine weighing about 50 billionths of a gram, and identified these compounds in a time-of-flight mass spectrometer modified by Dr. Studier to increase its sensitivity 300 times. The work was carried out with extreme care, astatine being two million times as radioactive as a similar quantity of radium.

Before the Argonne experiment, chemical research with astatine was done by indirect methods called "tracer chemistry" in which a tiny quantity of this element was added to one of the more plentiful halogen elements. The mixture was then reacted with other chemicals to determine if astatine and other halogens had similar properties.

By performing direct experiments with astatine, the Argonne scientists may have paved the way to direct determination of the chemistry of other rare artificial elements.

Chemists are now able to perform direct chemical reactions with all members of the halogen family. The principles they learn can be used to interpret the behavior of other families of chemical elements.

For instance, the halogens are classified as non-metals. However, the heavier members of the group begin to act more and more like metals. This tendency is most pronounced in astatine, the heaviest halogen.

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TECHNOLOGY

Non-Nuclear Explosive More Powerful Than TNT

► A NEW EXPLOSIVE called Astrolite is believed to be the most powerful non-nuclear "powder keg" ever developed. A company called Explosives Corporation of America has been incorporated as a wholly owned subsidiary of the Rocket Research Corporation, Seattle, to manufacture the new explosive that may have both military and commercial applications.

Laboratory experiments and field tests carried out during the last three years show Astrolite to be more powerful than dynamite, TNT, nitroglycerine and other explosives.

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TECHNOLOGY

Center Established For Research in Odor

► A CENTER devoted to research in odor detection and analysis has been established at IIT Research Institute, Chicago.

Called the Olfactronics and Odor Sciences Center, the facility will concentrate on research in odor classification, characterization, control, modification and measurement, Dr. James J. Brophy, vice president, said.

Olfactronics is a term referring to detection and measurement by analytical instruments of vapors and particles emitted from surfaces of various source substances.

Current olfactronics research conducted by IITRI for government and industrial clients includes development of a "bomb sniffer" to detect concealed explosives for the Federal Aviation Agency and a continuing study to classify and analyze vapors, or odors, that are characteristic of human beings.

The latter program eventually may enable law enforcement officials to record olfactory "fingerprints," identifying individuals by their unique sets of odors.

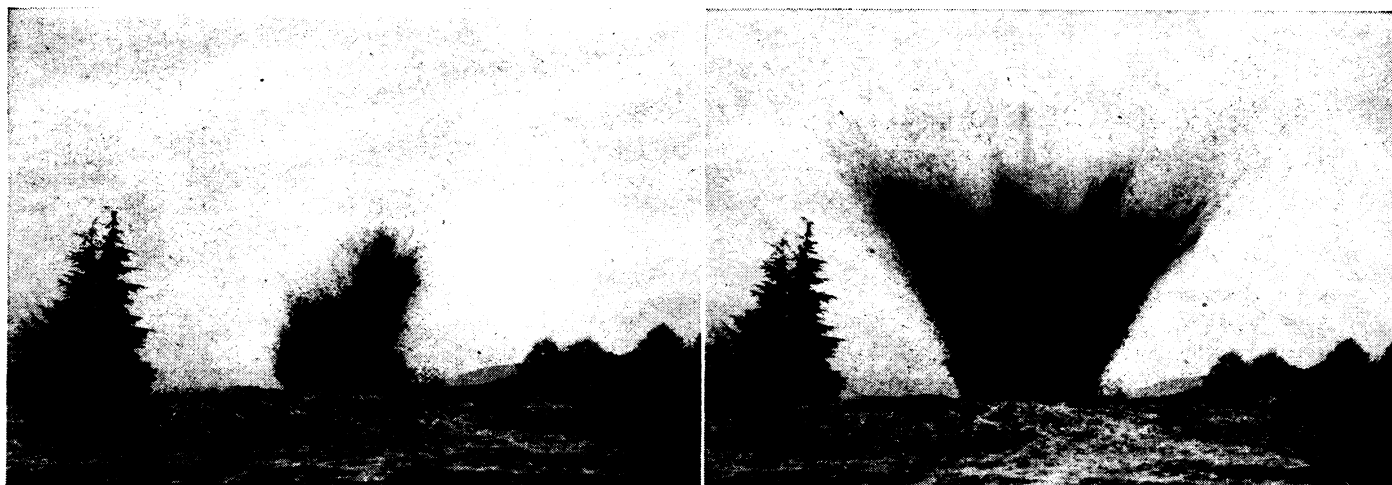
Olfactronics also is being developed as a possible aid to medical diagnosis and as a means of automatically monitoring malfunctions in electrical and mechanical systems.

Dr. Andrew Dravnieks, scientific advisor to IITRI's chemistry divisions, will head the center.

"The purpose of the center is to focus IITRI's technical capabilities on this interdisciplinary field, which includes areas ranging from physiology and ultramicrochemical analysis to diverse practical applications such as detecting bombs and improving food aroma," Dr. Brophy said.

The center will have the support of IITRI's professional staff.

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TNT

ASTROLITE

Rocket Research Corporation