CHEMISTRY

Discovery of Element 87 Reported by Cornell Chemists

X-Ray Examination of Complex Mineral Reveals Presence Of Substance to be Known Temporarily as "Eka-Caesium"

THE DISCOVERY of element 87, one of the two remaining missing or "doubtful" members of the chemist's periodic table, is reported in the mineral "samarskite," by Prof. Jacob Papish and Eugene Wainer of the department of chemistry of Cornell University, who used X-rays to examine it.

A discovery of element 87, one of the 92 ultimate building blocks of the material world, was announced a year ago in the minerals "lepidolite" and "pollucite" by Prof. Fred Allison and Dr. Edgar J. Murphy of the Alabama Polytechnic Institute. The Cornell researchers doubt this claim. They have examined solutions reported by Prof. Allison to contain number 87 but decided that it is present, if at all, in extremely small quantity.

"Magneto-optic" Method

Prof. Allison used a novel method of examination devised by himself, called the "magneto-optic" method. The reliability of this has not yet been tested by other investigators. The X-ray spectrum used by Prof. Papish and Mr. Wainer, on the other hand, is widely known to scientists and was successfully used in 1926 at the University of Illinois to identify America's first element Illinium, number 61, for the first time. In the hands of competent investigators it is a powerful way of detecting an element.

Prof. Papish and Mr. Wainer decided to examine the very complex mineral "samarskite," by means of the X-ray spectrograph. "Samarskite" is a curious department-store kind of a mineral containing uranium, tantalum, cerium, columbium and smaller amounts of many other elements.

Cornell chemists can base their claim to priority in this discovery, if they are successful, on the additional fact that they chemically concentrated the preparation in which they claim to have found this elusive element. This was not done by Prof. Allison.

A large quantity of the mineral was heated in a stream of hydrogen chloride gas and a mixture of chlorides of metals driven off. The distillate, after conversion into sulphates was purified by various chemical processes and finally fractionally crystallized as the alum salts of the mixture of the alkali metals.

The least soluble alum obtained, which was rich in the alkali metal caesium, the nearest family relative of 87, was then subjected to tests in the X-ray spectrograph. Five lines agreeing perfectly with those to be expected from the missing number 87 were found on the photograph. The basis of this test is that each chemical element gives characteristic lines on the X-ray spectrogram, whose position enables the physicist to tell its atomic number, or place in the series of elements.

The findings have been submitted to the American Chemical Society and published in its journal. The researches were supported by grants from the Heckscher Foundation for the Advancement of Research at Cornell University.

The authors believe that they have established the presence of the missing element in samarskite. However, they state:

"A name for the element will not be announced until additional confirmatory data are obtained."

Neighbor to Radium

Number 87 has been called "eka-caesium" because of its close relationship to caesium. It is the next door neighbor to radium in the periodic classification and should be similar in properties to sodium and potassium, the so-called alkali metals. The behavior of the Cornell samarskite extract agrees with this requirement.

There are 92 elements in the chemist's periodic classification of the elements. About only two of these, numbers 85 and 87, is there any doubt as to their nature and occurrence.

The further concentration of the mixture in which number 87 has been found will be watched with great interest by the scientific world. Several previous claims of the discovery of 87 have been disproved by later experiments. The properties of the element should be of great interest.

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PROF. JACOB PAPISH
Co-discoverer of "Eka-Caesium."

ENGINEERING

Navy's New Airship Hangar Will be Built in Sections

THE NAVY'S new airship hangar at Sunnyvale, Calif., final contracts for which have just been awarded by the Navy Department, will have the same general shape as the one at Akron, but it will "stretch" differently.

The Akron hangar is held fast at a point about the middle of the structure, allowing the ends to expand outward in hot weather. At Sunnyvale, however, according to naval engineers, the hangar will be split up into a middle and two end sections with expansion joints between them. Provision is made at these joints for two arches, set four feet apart and entirely unconnected, which will enable each section to do its stretching independently.

Work on the new hangar will begin immediately, the foundations and grading to be finished within six months, and the hangar proper to be completed about March, 1933. The hangar will be about three city blocks long, two blocks wide, and it will have a height equivalent to 18 stories. But in spite of its immensity, it will be smaller than the hangar at Akron.

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