PHYSICS

Theories of Conduction Upset by New Discovery

Current Found to Persist in Conducting Solution For Fraction of Second After Circuit is Broken

A DISCOVERY which may upset theories of how a conducting solution can carry an electric current is announced by Drs. Herschel Hunt and Joseph F. Chittum of Purdue University. The theories held at present date back to the work of Michael Faraday in the early years of the last century.

The Purdue investigators, for the last eight months, have been studying a queer phenomenon. They find that when the external source of electric current through a conducting solution is removed the current does not immediately stop, as present-held theory predicts. Common conducting solutions in everyday use include the acidic solution in an electroplating bath and the fluid in an automobile battery.

The strange, and hitherto undetected, effect has greatly interested scientists. Dr. Irving Langmuir, Nobel prize winner from General Electric Company's research laboratories, has suggested new lines for future experiments. Movement is underway to provide funds for research fellowships for further study.

The new discovery—called tentatively the Hunt-Chittum effect—indicates that for a short space of time, from a tenth of a second to one second, after the external current in the circuit is broken, electrochemical action continues in the solution. Electric current can be detected there without an external electric "driving force" of battery voltage being present.

To detect the small persistent current, Drs. Chittum and Hunt used as electrodes two tiny wires which can be moved about in the solution. Using such "electrical probes," they have observed the residual or persistent current under many conditions.

One strange experiment was to float, on the surface of the conducting solution, a metal vessel which was one terminal of the detecting circuit. The other terminal of this same circuit was a wire suspended in air, inside the floating vessel. Current was passed through the electrolyte bath. A thousandth of a second after this current was cut off the detecting circuit was put into operation and current was found to flow in it.

The amazing part of this test was that some of the current had to pass through the air to complete the detecting circuit. Yet there was no known voltage applied externally. Seemingly it has to come from within the electrolyte bath through electrochemical activity.

What importance the new discovery will have practically is yet unknown. At present its theoretical value in physics and chemistry outweighs practical uses. Yet studies of how electricity is carried in conducting solutions—the whole basis of the electrochemical industry—may lead to new applications.

While suggesting several possible means of explaining the strange phenomenon, the Purdue scientists offer no explanation as final.

"Because of the newness of the phenomena," they declare, "and the vastness of the experimental data, an explanatory theory adopted at present could not hope to be long-lived."

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CHEMISTRY

Silica Fluff is World's Lightest Known Powder

SILICA fluff, a rare, white, finely divided powder and the world's lightest material of its type was shown at the meeting of the American Chemical Society. Silica fluff is only one-fortieth as heavy as water and less than one-third the weight of cork.

The specimen of the light powder which chemists have tried to make for years without success, was exhibited by Prof. C. A. Jacobson of West Virginia University. Whether the sample Dr. Jacobson owns was a chemical freak or accident or not; it is certain that science has been unable to duplicate the conditions which turned out the original product fifteen years ago at Johns Hopkins University.

Silica fluff, Dr. Jacobson declared, consists of minute flakes of silica. In each flake are millions of tiny air bubbles so small that the high magnification in a microscope is necessary to see them.

WORLD'S LIGHTEST POWDER

Dr. C. A. Jacobson, chemist of West Virginia University is not pouring milk into the container. The free-flowing substance is silica fluff, world's lightest known powder.

The strange material has such an affinity for air that when the dust is shaken up in a bottle it behaves like a liquid, flopping and splashing from side to side. It can be poured through a small funnel and fumes in the receiving vessel like a liquid.

Dr. Jacobson told his fellow chemists that silica fluff may be a man-made chemical analogue of the strange substance called diatomaceous earth. The latter consists of the mineral remains of incalculable masses of single-celled organisms which inhabited prehistoric seas millions of years ago. Such tiny animals contained dissolved silica. When the animals died the silica remained to last through the eons of geological time which have elapsed since their death.

Natural deposits of diatomaceous earth were formed in Maryland, Virginia, Alabama and California when those regions were probably the bottoms of prehistoric oceans. It is used as an absorbent for nitroglycerin in making dynamite, also as a wood filler and in polishing powder.

Silica fluff might have some of these commercial uses. But first science must rediscover the lost secret of making it.

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