'Cold fusion' rebirth? New evidence for existence of controversial energy source

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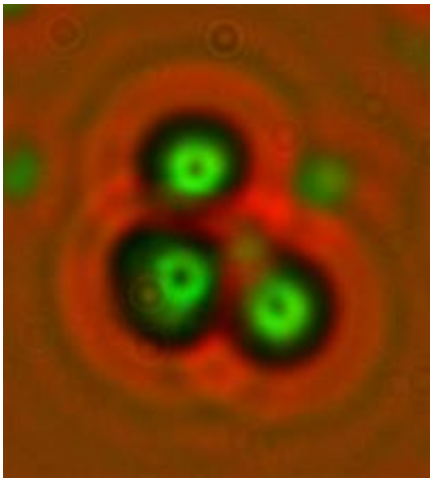

An experimental "cold fusion" device produced this pattern of "triple tracks" (shown at right), which scientists say is caused by high-energy nuclear particles resulting from a nuclear reaction Credit: Pam Boss, Space and Naval Warfare Systems Center (SPAWAR)

Researchers are reporting compelling new scientific evidence for the existence of low-energy nuclear reactions (LENR), the process once called "cold fusion" that may promise a new source of energy. One group of scientists, for instance, describes what it terms the first clear visual evidence that LENR devices can produce neutrons, subatomic particles that scientists view as tell-tale signs that nuclear reactions are occurring.

Low-energy nuclear reactions could potentially provide 21st Century society a limitless and environmentally-clean energy source for generating electricity, researchers say. The report, which injects new life into this controversial field, will be presented here today at the American Chemical Society's 237th National Meeting. It is among 30 papers on the topic that will be presented during a four-day symposium, "New Energy Technology," March 22-25, in conjunction with the 20th anniversary of the first description of cold fusion.

"Our finding is very significant," says study co-author and analytical chemist Pamela Mosier-Boss, Ph.D., of the U.S. Navy's Space and Naval Warfare Systems Center (SPAWAR) in San Diego, Calif. "To our knowledge, this is the first scientific report of the production of highly energetic neutrons from an LENR device."

The first report on "cold fusion," presented in 1989 by Martin Fleishmann and Stanley Pons, was a global scientific sensation. Fusion is the energy source of the sun and the stars. Scientists had been striving for years to tap that power on Earth to produce electricity from an abundant fuel called deuterium that can be extracted from seawater. Everyone thought that it would require a sophisticated new genre of nuclear reactors able to withstand temperatures of tens of millions of degrees Fahrenheit.

Pons and Fleishmann, however, claimed achieving nuclear fusion at comparatively "cold" room temperatures — in a simple tabletop laboratory device termed an electrolytic cell.

But other scientists could not reproduce their results, and the whole field of research declined. A stalwart cadre of scientists persisted, however, seeking solid evidence that nuclear reactions can occur at low temperatures. One of their problems involved extreme difficulty in using conventional electronic instruments to detect the small number of

neutrons produced in the process, researchers say.

In the new study, Mosier-Boss and colleagues inserted an electrode composed of nickel or gold wire into a solution of palladium chloride mixed with deuterium or "heavy water" in a process called co-deposition. A single atom of deuterium contains one neutron and one proton in its nucleus.

Researchers passed electric current through the solution, causing a reaction within seconds. The scientists then used a special plastic, CR-39, to capture and track any high-energy particles that may have been emitted during reactions, including any neutrons emitted during the fusion of deuterium atoms.

At the end of the experiment, they examined the plastic with a microscope and discovered patterns of "triple tracks," tiny-clusters of three adjacent pits that appear to split apart from a single point. The researchers say that the track marks were made by subatomic particles released when neutrons smashed into the plastic. Importantly, Mosier-Boss and colleagues believe that the neutrons originated in nuclear reactions, perhaps from the combining or fusing deuterium nuclei.

"People have always asked 'Where's the neutrons?'" Mosier-Boss says. "If you have fusion going on, then you have to have neutrons. We now have evidence that there are neutrons present in these LENR reactions."

They cited other evidence for nuclear reactions including X-rays, tritium (another form of hydrogen), and excess heat. Meanwhile, Mosier-Boss and colleagues are continuing to explore the phenomenon to get a better understanding of exactly how LENR works, which is key to being able to control it for practical purposes.

Mosier-Boss points out that the field currently gets very little funding

and, despite its promise, researchers can't predict when, or if, LENR may emerge from the lab with practical applications. The U.S. Department of the Navy and JWK International Corporation in Annandale, Va., funded the study.

Source: American Chemical Society (news : web)