

# FUSION facts

A Monthly Newsletter Providing Factual Reports On Cold Fusion Developments

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*Fusion Facts* Now Reports on Both Cold Fusion and Other Enhanced Energy Devices.

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### ANOTHER ANNIVERSARY!

**7** years

1989 - 1996

of Cold Fusion.

Our thanks and encouragement to all  
the courageous pioneers in the field.

Your persistence has paid off.

*NOW AVAILABLE*

**JOURNAL OF NEW ENERGY**

Low Energy Nuclear Changes Symp. Proceedings  
See page 25

## A. SPACE ENERGY BLOWS NASA'S FUSE

Look who bumped into what in the ionosphere!

Harold Aspden (Sabberton Research), "Space Shuttle 'Columbia' Encounters Excess Energy?"

One might wonder when those of us engaged in the 'free energy' pursuit will reach the end of our tethers. Sadly, the space shuttle 'Columbia,' which was on a mission to tap into the energy of the ionosphere, has (with near perilous consequences for the seven-man crew) already done that with the loss of a \$442 million satellite. **This was tethered to the space shuttle by a 12.8 mile long cable which was blown apart by an unpredictable excess of energy.**

A U.K. newspaper report dated 27th February 1996 stated: "Video footage beamed down later to Mission Control at the Johnson Space Center in Houston, Texas, showed the end of the tether - made from copper, nylon and Teflon - looking charred and melted, It was said to resemble 'curly french fries.' There was a 'large electrical discharge along the tether.'

So, what went wrong? Well, as we readers of *Fusion Facts* can well imagine, **the experiment was a large scale version of the Correa discharge tube** or the Chernetskii self-generating discharge device or the Spence device, all of which reveal excess power. The only difference was that the 'evacuated tube' was replaced by the rarified plasma state of the ionosphere, where there are as many positive ions and electrons. **The space shuttle Columbia was, in fact, the cathode and the now-lost satellite was the anode. The cable was the power supply circuit and the intervening ionized space provided the discharge path.**

The excess energy anomaly was that of a cold-cathode discharge where inexplicably large forces act preferentially

upon the heavy positive ions and drive them into the cathode. **We know from such experiments that the cathode reaction forces developed by impact of positive ions can be thousands of times greater than theory predicts.** It would seem that this possibility, which owes its origin to a fundamental breach of physical law, was not factored into the design of the experiment. The protons in the upper ionosphere regions of the atmosphere which provided the closure current would be driven with enormous force into the tether connection point (the cathode) on Columbia. It is no wonder that the cable fused and the mission failed and that, I submit, is **all because the extremely high anomalous cold-cathode reaction forces know from decades of research have never been properly understood by the scientific community.**

What we can, therefore, now point to is the failure of a major space mission aimed at generating power in space because far more power was produced than was bargained for! It had not been understood that **the aether which fills that space is ready and willing to shed excess energy once we contrive to develop circuital current flow that is not that of an all-electron circuit.**

I add a footnote quotation from the 1989 Novosti Press Agency (USSR) release on the Chernetskii project: "In a bid to explain the experimental data, the researchers actually tried to prove the impossible and one of their proofs turned out to be violent. The one megawatt substation at the Moscow Aviation Institute, where Chernetskii and Galkin were staging an experiment with a powerful plasma unit, burned out. When the discharge currents reached criticality, superstrong current was "born" in the generator and went back into the network, playing havoc with the safety devices calculated for short circuit events.

The United States of America should not be sending men into space on missions aimed at power generation by tapping into plasma fields until enough research on the anomalous cold-cathode plasma discharge problem has been done in the Earth-based laboratory environment to understand fully this mystery energy source. At this time, Dr. Paulo Correa in Canada has the means for demonstrating the generation of excess energy using cold-cathode discharge tubes of special construction in which the cathode is able to take off the power electrically in a controlled manner. The time has come for the Establishment scientists to wake up to the possibility that we can draw upon energy in the space medium but we should be looking at those protons and not just at those electrons! [See Correa's U.S. patents numbers 5,416,391 and 5,449,989. -Ed.]

#### EDITOR'S COMMENTS

Newspaper articles, apparently based on information provided by NASA, are using the phrase "broken tether cable". The

news included the following: the pictures of the frayed cable end that appeared to be caused from high voltage; the reported destruction of nearly all electronic systems in the tethered satellite; the report of an experienced "3500 volts" from the Italian group who built the satellite; the nearby passage of the shuttle to the formerly-tethered satellite and the recording of a small amount of data before complete failure of the satellite's systems; the suggestion that the some of the electronics were shielded to withstand a possible 10,000 volt static charge and yet the electronic systems failed. **It is fortunate that the tether acted as a fuse because it may have protected the shuttle from serious damage.** We suggest that future orbiting satellites and perhaps other types of space vehicles may be able to readily tap space energy for charging batteries and other power uses. **First NASA will need to understand that there is an energetic aether and that may be a time-consuming task.**

## B. EDITORIAL

### THIS MONTH: 7 YEARS OF COLD FUSION R&D

Seven years and 3,000 papers later, the University of Utah's arranged press conference with the announcement by Pons and Fleischmann of their discovery of cold fusion has progressed to the Patterson Power Cell™. Every year since that announcement, there have been new devices discovered, new replications of the Pons-Fleischmann Effect, and new condemnations that cold fusion doesn't work. Scientists in 30 countries have reported some success in replicating or improving on the original cold fusion discovery.

Seven years ago there was an intense media treatment with front-page covers on national news magazines. Then the naysayers began their attack. Regardless of the continuing successful replication, month after month, as reported in this monthly newsletter since July 1989, **there were those who assured the rest of the world that cold fusion was not scientifically possible.** One non-scientist was even paid a sizeable retainer to destroy cold fusion. The result was the book Bad Science, The Short Life and Weird Times of Cold Fusion, by Gary Taubes. This book is destined to be a collector's item to be placed along with publications crying that the Wright brothers invention was of no consequence, that atomic energy was not possible, that the electric light was only a lab curiosity, *ad nauseam*.

Those scientists who are not dedicated skeptics and who have taken time to follow the cold fusion literature will have noted the following:

- ◆ Thermal energy sufficient to boil off the electrolyte in a Pons-Fleischmann electrochemical cell (palladium, heavy water, and lithium) is well known and replicable.
- ◆ Light-water, nickel cathodes, and alkali-metal electrolytes have produced excess heat ranging from 30 percent to >700 percent.
- ◆ Molten salts with a palladium cathode produces excess thermal energy.
- ◆ Nickel metals properly treated in a hydrogen-gas atmosphere produce excess heat.
- ◆ Although not easily replicated, hydrogen isotope gas treatments at low pressures, low voltage (few hundred volts), and palladium cathodes result in both excess heat and considerable nuclear reactions.
- ◆ Electrical discharges, in various configurations, produce excess heat, or tritium, or other signs of nuclear reactions.
- ◆ Deuterium gas in certain types of crystals with applied electric potential produces thermal energy and neutrons.
- ◆ Palladium wires loaded with deuterium show evidence of tritium production.
- ◆ Special proton conductors coupled with electric potential produce thermal energy.
- ◆ Gold-plated palladium sandwiches produce numerous neutrons.
- ◆ Micro-bubbles of vapor generated by acoustic energy produce excess heat when directed at a palladium surface.
- ◆ Miniature spheres plated with thin layers nickel-palladium-nickel produce over 500 times as much thermal energy as applied electrical energy.

With all of that evidence, there are those who still insist that cold fusion is contrary to well-proven scientific facts, **and therefore cannot exist!** So, where do we go from here? I believe it was Mach who complained that you can't teach old scientists to accept fundamental new discoveries -- you have to wait for the old scientists to die off and teach the new scientists. After seven years, the dying-off is proceeding. John Dash is using heavy-water, palladium cathode, lithium electrolyte experiments as standard laboratory assignments which allow students to do their own low-energy nuclear reactions. The new scientists are not listening to the retiring and "dead but not buried" old scientists who, unswayed by facts, still proclaim the demise of cold fusion.

**A more important development is the by-products of the cold fusion controversy.** Many scientists, engineers, and inventors who have been working on, but not publishing, their own controversial experimental work are now discussing their own findings. Part of this unusual story is disclosed in a collection of papers, the proceedings of a **Conference on Low-Energy Nuclear Reactions** held on June 19, 1995 at College Station, Texas. Hosted by John O'M. Bockris (to the intense dismay of some of his esteemed colleagues) this conference was attended by scientists from Canada, Italy, Japan, Russia,

Ukraine, and the U.S. **These proceedings are available from the Institute for New Energy and have been published by Fusion Information Center as Volume 1, No. 1 of the *Journal of New Energy*.** This new journal is expected to be published quarterly. All of you who have had difficulty in getting your cold fusion and other new-energy reports published now have a peer-reviewed (but not by secret reviewers) journal that will welcome new experimental and theoretical professional papers.

As reported in this newsletter, there are other new-energy devices that will add to the energy impact being made by cold fusion devices. It is expected that the future development of high-density charge clusters will provide direct electrical power in the near future. The development of super strong magnets is greatly encouraging to those many inventors of magnetic motors. A recent video shows such a permanent-magnet-rotor motor belted to a generator which is hooked to a pair of headlights. The motor is connected to a battery. The motor revs up and drives the generator. The lights are connected to the generator and illuminate. The battery feeding the motor is then disconnected. The motor continues to spin. So does the generator. **The lights remain on!** If you believe that cold fusion was difficult to introduce into the current models of traditional science, **try to explain this video!** Of course, it will be explained as fraud -- the same explanation used for cold fusion.

Will it take another seven years for cold fusion, high-density charge clusters, and super motors to be commercialized? **Not likely.** A variety of business plans are now being circulated among venture capital companies. Stock offering circulars are being written. New companies are being formed. Licensing rights are being negotiated. Even a few corporations are hiring new-energy consultants. Books are being prepared. New symposia and conferences are being planned. New product announcements are being readied. New patents are being issued and new patent applications are being filed. Opposite to the days of Joseph and the Pharaohs of Egypt, the seven years of drought will be followed by seven years (or more) of plenty in terms of commercial funding and interest in new, enhanced-energy systems.

In the past seven years we have more fully learned the following:

- ◆ Low-energy nuclear reactions are not only possible but abundant.
- ◆ There is an energetic aether -- at least, based on the law of parsimony, it is the most likely explanation of many of the observed and reported anomalies.
- ◆ Magnets, considered by theory to be only able to be incrementally improved, have been improved by at least three hundred percent.

- ◆ Properly designed motors can produce at least three times as much mechanical energy as compared to input electrical energy.
- ◆ Electric plasmas and charge clusters can produce more energy output than input.
- ◆ Some radioactive elements can be stabilized.
- ◆ Scientific discovery is alive and well, it is only the models that require refurbishing.
- ◆ The solutions to the energy problem and to some of the environmental problems are now available.
- ◆ There are many dedicated scientists and inventors who (like Pons and Fleischmann) cherish truth more than peer acceptance.

### C. RUSSIAN CONFERENCE

The following are abstracts of papers published in the Russian Proceedings of the International Symposium on Cold Fusion and Advanced Energy Sources, held in Minsk, Belarus, in May of 1994. The abstracts were taken from *Chemical Abstracts*. Some of these papers were published completely in the Cold Fusion Source Book, published in 1994 by the Fusion Information Center. Because of translation problems, and the distance involved in communications, not all of the papers were made available to the Cold Fusion Source Book, and therefore are published in this Russian proceedings for the first time. Any differences in titles or abstracts may be attributed to translation.

#### BELARUS - NONEQUILIBRIUM SYSTEMS

*Chemical Abstracts*, 16 Oct. 1995

A. V. Bulyga, (Univ. Minsk, Belarus), "Modeling of Processes of Self-Organization and Energy Conversion in Strongly Nonequilibrium Systems of Inorganic Nature," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 19-26, in Russian.

#### AUTHOR'S ABSTRACT

To study the mechanism of the self-organization process of nonequilibrium systems of inorganic nature, a physical model in the form of a vacuum thermoelectronic converter (VTC) with a narrow interelectron [sic] gap is proposed. The prospects are discussed of using such a model for simulating the processes of self-organization and direct conversion of energy in nonequilibrium systems of inorganic nature. A study of the self-organization of nonequilibrium systems of inorganic nature allows one to more precisely define the mechanism or processes of energy conversion under conditions of strong thermodynamic nonequilibrium, which is characteristic, for example, for thermoelectronic generators, as well as for other

energy sources, among which are those based on the use of cold nuclear fusion.

#### BELARUS - FAST CHEMICAL REACTIONS

*Chemical Abstracts*, 13 Nov. 1995

V.A. Filimonov, (Inst. Fiz.-Khim. Probl., Belarus), "Cold Nuclear Fusion and Ultrafast Low Temperature Chemical Processes in Solids," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 331-339, 17 refs, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

#### AUTHOR'S ABSTRACT

A review on the premise that there is a definite analogy between cold nuclear fusion, on the one hand, and the numerous fast chemical reactions and physicochemical processes in solids at room temperature and lower temperatures on the other hand.

#### BELARUS - DEVELOPING FUEL CELLS

*Chemical Abstracts*, 16 Oct. 1995

A.A. Vecher, (Beloruss. Gos. Univ., Minsk, Belarus), "Fuel Cells as a Tangible Energy Source," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 33-40, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

#### AUTHOR'S ABSTRACT

A discussion on the prospects of using fuel cells as a tangible energy source considering the alternatives. Fuel cells with polymer electrolyte, alkaline electrolyte or H<sub>3</sub>PO<sub>4</sub> electrolyte are described. The solid electrolyte allows one to avoid the problems related to maintaining the porosity of the electrodes for achieving a 3-phase boundary of fuel / liquid electrolyte / solid electrode. Because the electrolyte composition is constant, then the type of fuel and oxidizing agent can be varied. The high temperature allows one to eliminate many problems related to polarization; therefore, precious metals are not required. However, problems related to the high temperature and the strict requirements for construction do develop.

#### CHINA - REVIEW OF CHINESE RESEARCH

*Chemical Abstracts*, 13 Nov. 1995

X.Z. Li, (Univ. Tsinghua, Beijing, Peop. Rep. China), "Searching for Facts [on Cold Nuclear Fusion] with a View of

the Future," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 211-218, 14 refs, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

## AUTHOR'S ABSTRACT

A review of studies on cold fusion in China over the last 5 years. Special significance is given to tests conducted in China of reproducible experiments and the study of the basic parameters which controlled the reproducibility. Also, the theoretical computations explaining these phenomena are described.

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**FRANCE - COLD FUSION BY SPARK DISCHARGE**

*Chemical Abstracts*, 13 Nov. 1995

J. Dufour, J. Foos, and J-P. Millot (CNAM, Paris, France), "Cold Nuclear Fusion Accomplished by a Spark Discharge," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 203-210, 6 refs, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

## AUTHORS' ABSTRACT

A review is presented on useable concepts and basic results of the search for cold fusion, experiments, and strategies used for creating the energy balance in the system.

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**HUNGARY - POSITIVE ENERGY BALANCE**

*Chemical Abstracts*, 13 Nov. 1995

O. Pinter, F. Daruhazi, (Inst. Chem., Budapest), "Reliably Reproducible Experiment on Electrochemical Cold Nuclear Fusion with a Positive Energy Balance," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 260-262, in Russian.

## AUTHORS' ABSTRACT

The results are described of an electrochemical experiment in which nuclear fusion is induced with a high degree of reproducibility. Measurements showed that the output of thermal energy by the electrochemical cell significantly exceeds the quantity of electric energy delivered to the cell. In the  $\gamma$ -ray spectra, measured in heavy water used as a solvent, a significant increase in intensity in the regions of 0.6 and 3 MeV is observed in comparison with corresponding experiments with light water.

**INDIA - SUCCESS WITH LIGHT WATER**

*Chemical Abstracts*, 16 Oct. 1995

M. Shrinivasan, P. Abi Babu, M.B. Bajpai, D.S. Gupta, U.K. Mukherjee, H. Ramamurthy, T. Sankarnarainan, A. Sina, A. Shyam (Bhabha At. Res. Cent., Bombay), "Measuring Excess Heat and Tritium in Electrolytic Nickel-Water Cells," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 219-227, 18 refs, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

## AUTHORS' ABSTRACT

A brief description of cells and the calorimetric method for measuring the excess heat and a summary of the basic results of the calorimetric studies are given, along with the results of measuring the T produced in electrolytic cells in connection with the search for cold nuclear fusion.

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**ITALY - PULSED ELECTROLYSIS**

*Chemical Abstracts*, 16 Oct. 1995

F. Chelani, A. Spallone, P. Tripodi, A. Petrocci, D. Di Gioacchino, M. Boutet, P. Marini, V. Di Stefano (Italy), "Achieving a Degree of Saturation up to 1.2:1 in the System D/Pd by Microsecond Pulsed Electrolysis at High Power in Palladium Plates," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 267-274, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

## AUTHORS' ABSTRACT

The authors metallurgically examined different plates of Pd, prepared by the cold rolling method. They concentrated on the absorption of D by these plates at the time of pulsed electrolysis. They used a high peak current density ( $\leq 100$  A) with very short-duration pulses (1 ms) and a repetition rate of  $\leq 20$  kHz. The amplitude power of each pulse can reach 50 kW. A Pt anode was placed in the solution of LiOD (0.3M in D<sub>2</sub>O). A large ratio of D/Pd ( $\sim 1.2:1$ ) was attained; the absorption behavior of D over time strongly depends on the metallurgy of the plate. The preparation of the surface of the Pd plate evidently also plays a role in the phenomenon of absorption. Metallurgical and electric parameters, as well as the hardness, overvoltage and absorption rate, can be useful indicators of the absorption by the plate.

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**KAZAKHSTAN - ENERGY AMPLIFIER**

*Chemical Abstracts*, 16 Oct. 1995

D.S. Maili, E.G. Batyrbekov, S. Hora, D. Patel, D. Tomkins, R. Zih (Inst. Yad. Fiz., Apatity, Kazakhstan), "Energy

Amplifier Based on Multilayer Thin-Film Electrodes," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 181-186, in Russian.

#### AUTHORS' ABSTRACT

The feasibility is discussed of using the theory of a "swimming electron layer" for constructing multilayer thin-film electrodes. The basic idea of such an approach consists of increasing the energy output in the interlayer space between pairs of metals especially selected for this purpose. The results are presented of preliminary experimental studies of the energy output during electrolysis using a multilayer thin-film cathode especially constructed on the basis of the above theory.

#### SOUTH KOREA - GAMMA RADIATION DETERMINATION

*Chemical Abstracts*, 13 Nov. 1995

J.T. He, Y.P. Zhang, G. Ren (Inst. Phys. High. Energy, S. Korea), "Determining the Characteristic Gamma Radiation from Electrodes in the System Pd-D Formed During a High-Voltage Discharge," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 175-181, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

#### AUTHORS' ABSTRACT

Data are presented attesting to the emergence of different characteristic  $\gamma$ -rays from electrodes in the Pd-D system during a high-voltage discharge. They can be explained as elements of electrodes excited by high-energy charged particles appearing at the time of relaxation radiation during high-voltage discharges. Neutron signals were not recorded at the time of high voltage pulses. Moreover, during intervals between pulses of high voltage, neither neutron signals nor  $\gamma$ -ray signals were detected.

#### JAPAN - CAPTURED NEUTRON MODEL

*Chemical Abstracts*, 13 Nov. 1995

Hideo Kozima, Setsuhi Watanabe, (Shizuoka Univ., Japan), "Possible Collisions t-d and d-d in a Cold Fusion Model Catalyzed by a Captured Neutron," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 299-307, in Russian.

#### AUTHORS' ABSTRACT

An estimate is made of the elastic scattering and transverse cross section of the fusion of tritons, neutrons and deuterons, generated by the mechanism of catalyzed (by a captured

neutron) cold fusion of deuterons in the lattice of metal hydrides, for providing the anomalous phenomena observed in these experiments. In optimal situations, when the high-energy attacking particles move forward along a line through the interstitial ones, effective fusion reactions take place, forming many reaction products which explain the burst neutrons. Sometimes, in this case, in the experiments one observes the evolution of a huge amount of excess heat.

#### JAPAN - IRON DETECTED ON ELECTRODES

*Chemical Abstracts*, 11 Dec. 1995

Tadaeshi Omori, Michio Enyo (U. Hokkaido, Sapporo, Japan), "Detecting Iron Atoms on Gold Electrodes used for Electrolysis of Neutral and Alkaline H<sub>2</sub>O and D<sub>2</sub>O," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 228-240, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

#### AUTHORS' ABSTRACT

An electrode in an electrolyte of K<sub>2</sub>CO<sub>3</sub>, Na<sub>2</sub>CO<sub>3</sub>, Na<sub>2</sub>SO<sub>4</sub>, KOH, and NaOH produced the evolution of excess heat in addition to Fe atoms on the Au electrode. The electrolysis was conducted over 7 days with a constant current of 1 A. The Fe atoms were detected by AES spectrometry and could not be accounted for by impurities in the chemicals. The excess heat was 187-723 mW and was proportional to the excess Fe atoms observed. The probable source of the excess Fe atoms was nuclear synthesis, but at this stage no reaction scheme can be proposed.

#### ROMANIA - LOGICAL SYSTEM APPROACH

*Chemical Abstracts*, 13 Nov. 1995

P. Glück (Inst. Izot. Mol. Technol., Cluj-Napoca, Romania), "Cold Nuclear Fusion: Logical System Approach," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 156-161, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

#### AUTHOR'S ABSTRACT

A strategy is proposed, based on an artist's concept of surface dynamics, a broad approach, and cooperation, to better understand the difference between plasma nuclear fusion and cold nuclear fusion.

**RUSSIA - PROOF OF DINEUTRONS 1**

*Chemical Abstracts*, 13 Nov. 1995

Yu.A. Istomin, K.A. Kaliev, V.Yu. Istomin (Russia), "Experimental Proof of the Existence of Dineutrons, Part 1," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 311-316, in Russian.

## AUTHORS' ABSTRACT

The dineutron theory of cold nuclear fusion was subjected to experimental verification and confirmed by calculations. Final confirmation has yet to be obtained, however, for the experimental world. Cold nuclear fusion in stars is discussed in connection with this theory.

**RUSSIA - PROOF OF DINEUTRONS 2**

*Chemical Abstracts*, 13 Nov. 1995

Yu.A. Istomin, K.A. Kaliev, V.Yu. Istomin (Russia), "Experimental Proof of the Existence of Dineutrons, Part 2," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 317-323, in Russian.

## AUTHORS' ABSTRACT

The dineutron theory of the phenomenon of cold nuclear fusion is based on the fact that this phenomenon itself is nothing less than the result of the nuclear interaction of dineutrons with other well-known nuclei of elements of the Periodic System, while the dineutrons themselves are products of induced capture of electrons by deuterons. Several experiments are described. As a result of carrying out these experiments the following were established: (1) at a negative potential on a crystal, the emission of neutrons is continuous (its level exceeds the background level by >500 fold); and (2) during the exchange, the polarity of the emission is completely suppressed.

**RUSSIA - PROOF OF DINEUTRONS 3**

*Chemical Abstracts*, 13 Nov. 1995

Yu.A. Istomin, K.A. Kaliev, V.Yu. Istomin (Russia), "Experimental Proof of the Existence of Dineutrons, Part 3," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 323-330, in Russian.

## AUTHORS' ABSTRACT

The elementary crystal cell of the material used in the experiment (i.e. V oxide bronze) is represented by the ion  $K_7V_4O_{12}^{3+}$ , in which the skeleton of V atoms and O atoms

determines the shape of the cell in the form of a plane with 1-2 layers of atomic association of closed links of a chain. The layers, as in graphite, are connected by an electron cloud. After etching of the crystal by HCl, cold nuclear fusion does not develop. An experiment showing the existence of dineutrons is described. To decrease the radiation danger, one can conduct the etching of the crystals by nondeuterated  $H_2SO_4$  and by a solution of DI in heavy water.

**RUSSIA - HIGH CURRENT ARC DISCHARGE**

*Chemical Abstracts*, 13 Nov. 1995

V.P. Afanas'ev, A.A. Dyuzhev, B.I. Tsirekl, S.M. Shkol'nik, N.M. Kazarinov, L.M. Solin (FTI im. Ioffe, St. Petersburg, Russia), "Possibilities for Stimulating D-D Fusion in a Gas-Saturated Metal Using a High-Current Arc Discharge," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 340-348, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994 Engl.]

## AUTHORS' ABSTRACT

An attempt was made to initiate cold nuclear fusion by using a high-current pulsed arc discharge in a vacuum, the Pd or Ti cathode of which was previously saturated with D. The neutron flux from the sample can be estimated as 0-10 neutrons/s. There were a number of inadequacies in the experiment conducted by the authors which they enumerate.

**RUSSIA - NIOBIUM & STAINLESS STEEL**

*Chemical Abstracts*, 13 Nov. 1995

I.P. Chernov, V.M. Golovkov, V.A. Korobenko, A.P. Mamontov, T.N. Mel'nikova, Yu.P. Cherdantsev (Tomsk Plitekh Univ., Russia), "Cold Nuclear Fusion During Deuterium Saturation of Niobium and Stainless Steel," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 307-310, in Russian.

## AUTHORS' ABSTRACTS

The appearance of cold nuclear fusion was studied during saturation of Nb and stainless steel with D from the gas phase and upon electrolysis. Nb was studied on the basis of work by V.A. Romodanov (1991) where high yields of T ( $10^{-3}$  T/D) were observed during bombardment with D from a glow-discharge plasma. The recording of neutrons and  $\gamma$ -rays was accomplished by using a single-crystal scintillation spectrometer based on a stilbene crystal with diameter 40 and height 10 mm and FEU-93.

**RUSSIA - LOOKING FOR GAMMA RADIATION***Chemical Abstracts*, 13 Nov. 1995

Yu.P. Chertov, Ya.B. Skuratnik, N.I. Khokhlov (Nauchno-Issled. Tsentr. Fiz.-Tekh. Probl., Russia), "Attempts at Recording Gamma Radiation During the Thermal Cycling of a Deuterated Alloy  $\text{LaNi}_{4.75}\text{Al}_{0.25}$ ," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1991, pp 118-121, in Russian.

**AUTHORS' ABSTRACT**

An attempt was made to record  $\gamma$ -quanta, which can be emitted during nuclear reactions in deuterated alloys based on La and Ni during their thermal cycling and of radioactive isotopes formed as a result of nuclear reactions from their  $\gamma$ -lines. In the experiment, the alloy  $\text{LaNi}_{4.75}\text{Al}_{0.25}$  was used. The temperature was varied from 77 to 290 K. The pressure of D situated in the bulk after saturation of the alloy was  $4.5 \times 10$  pascal. The  $\gamma$ -quanta were recorded by a Ge semiconductor. For positive identification of the  $\gamma$ -lines, the measurements need to be conducted under lower background conditions.

**RUSSIA - ELEMENTAL PHASE TRANSITIONS***Chemical Abstracts*, 13 Nov. 1995

A.M. Durachenko, E.Ya. Malinochka (Vserosiisk. Elektrotekh. Inst., Moscow), "Elemental-Phase Transitions with Reactions of the Type Cold Nuclear Fusion in Metallic Melts of Glassy-Forming Systems," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 127-131, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

**AUTHORS' ABSTRACT**

Studies were conducted, based on the conditions and mechanisms of cold nuclear fusion reactions in examples of metal alloys of glass-forming systems, for example, metal-metalloid (Fe-Ni-P-C) and metal-metal (Cu-Zr) systems. X-Ray structural analysis was made of  $\text{Fe}_{70}\text{Ni}_{10}\text{P}_{13}\text{C}_7$ .

**RUSSIA - FUSION IN OXIDE BRONZES***Chemical Abstracts*, 13 Nov. 1995

K.A. Kaliev, Yu.I. Istomin, D.P. Babaeva, I.D. Remez, V.V. Butrimov, E.G. Golikov (Russia), "Surface Processed in the Initiation of Cold Nuclear Fusion in Oxide Bronzes," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 162-169, in Russian.

**AUTHORS' ABSTRACT**

The role was investigated of the phase boundary surface of electrolyte/K W oxide bronze of composition  $\text{K}_{0.33}\text{WO}_3$ . The anisotropy of the electron environment of the D ion, formed as a result of the disproportionation of W(V), also lies at the basis of initiation of cold fusion in structures of W oxide bronzes.

**RUSSIA - COLD FUSION THEORY MODEL***Chemical Abstracts*, 13 Nov. 1995

K.B. Korotchenko (Tomsk Politekh. Univ., Russia), "Model of the Theory of Low-Temperature Nuclear Fusion," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 282-287, in Russian.

**AUTHORS' ABSTRACT**

A theoretical model is proposed for the conversion of an atom of D (or H) into a meso-atom, which allows one to explain all the characteristics of an experiment on "warm fusion" by R. J. Beuler, et al., 1989, not only qualitative but also quantitative.

**RUSSIA - RECORDING BETA SPECTRA***Chemical Abstracts*, 13 Nov. 1995

R.N. Kuz'min, P.O. Revokatov, E.M. Sakharov, B.N. Shvilkin (MGU, Moscow), "Recording Beta Spectra from the Surface of Deuterated Solids," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.* 1994., pp 122-126, in Russian.

**AUTHORS' ABSTRACT**

Studies were made of metal deuterides as well as single crystals of DKDP. In the studies using samples of Pd and Ti, saturated with D, a significant excess amount of T was established in the surface layers above the background value ( $10^9$ - $10^{11}$  atoms in a layer  $\sim 10^3$  Å thick) and with regard to the yield of neutrons.

**RUSSIA - DISPERSED CRYSTALLINE MEDIUM***Chemical Abstracts*, 13 Nov. 1995

V.A. Kuznetsov, A.G. Lipson (Inst. Fiz. Khim., Moscow), "Interaction of the Flux of Elastic Energy with a Highly Dispersed Crystalline Medium and Mechanism for Cold Nuclear Fusion," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 150-155, in Russian.



## AUTHORS' ABSTRACT

A quantum approach was developed to the absorption of elastic energy of crystalline particles of rather small dimensions, on the basis of which a mechanism for cold nuclear fusion in deuterated solids is proposed. The nuclear processes can be stimulated in this case by the redistribution and transformation of the elastic energy stored by the crystal lattice (e.g. of DKDP).

**RUSSIA - CF WITH SUPERCONDUCTORS**

*Chemical Abstracts*, 13 Nov. 1995

A.G. Lipson, D.M. Sakav, B.F. Lyakhov, E.I. Saunin, B.V. Deryagin, T.S. Ivanova (Inst. Fiz. Khim., Moscow), "Generation of Products from Nuclear DD-Fusion in High Temperature Superconductors  $YBa_2Cu_3O_{7-x}Dy$ ," *Kholodnyi Yad. Sint. Nov. Istechniki Energ., Mezhdunar. Simp.*, 1994, pp 144-149, in Russian.

## AUTHORS' ABSTRACT

The reproducible generation of neutrons and T was detected in ceramic samples of high-temperature superconductors (HTS) of 1-2-3 type saturated with D (e.g.  $YBa_2Cu_3O_{7-x}Dy$ ) by an electrochemical method. Controlled saturation of samples of HTS by D using the electrochemical method was accomplished, and a number of its electrophysical parameters were determined. As a result, a rather clear identification was successfully obtained of the assumption of neutron bursts near  $T_c$ , depending on the degree of deuteration of HTS, as well as to evaluate the rate of generation of T in deuterated HTS samples during their thermal cycling.

**RUSSIA - CATHODIC POLARIZATION**

*Chemical Abstracts*, 16 Oct. 1995

B.F. Lyakhov, A.G. Lipson, V.A. Kuznetsov (Inst. Fiz. Khim., Moscow), "Nature of Excess Energy Produced at a Palladium Electrode Under Conditions of Cathodic Polarization in Aqueous Electrolytes," *Kholodnyi Yad. Sint. Nov. Istechniki Energ., Mezhdunar. Simp.*, 1994, pp 170-174, in Russian.

## AUTHORS' ABSTRACT

An attempt was made to explain the excess energy production (both in the form of heat as well as in the form of plastic deformations) observed in experiments involving the electrolysis of  $D_2O$  or  $H_2O$  on Pd cathodes, from a position based on the ideas of special properties of thin layers of water near hydrophilic surfaces. The obtained data allow one to formulate the authors' viewpoint on the problem of cold

nuclear fusion, at least up to the present time, in the absence of reliable data on a correlation between thermal and ordinary nuclear processes. Under the term "cold nuclear fusion", the authors propose a combination of stochastic, predominantly individual processes of the fusion of nuclei of D ordered in the crystal lattice, stimulated by fluctuations of the energies of atomic (chemical) transformations, occurring in deuterated solids during the development in them of substantial nonequilibrium conditions brought about by mechanical electrochemical and thermal actions, as well as by phase transitions, etc.

**RUSSIA - COLD FUSION MECHANISMS**

*Chemical Abstracts*, 13 Nov. 1995

L.G. Sapogin (Tekh. Univ., Russia), "Mechanisms of Cold Nuclear Fusion," *Kholodnyi Yad. Sint. Nov. Istechniki Energ., Mezhdunar. Simp.*, 1994, pp 139-143, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

## AUTHOR'S ABSTRACT

An evaluation was made of experiments on cold nuclear fusion in this review with 3 references.

**UKRAINE - NUCLEAR TRANSMUTATION**

*Chemical Abstracts*, 13 Nov. 1995

G.S. Rabzi, A.E. Fabrikant (Ukr. Akad. Original'n. Udei, Odessa, Ukraine), "Experimental Study of Nuclear Transmutation During Electrolysis of Water Using a High-Intensity Electric Field," *Kholodnyi Yad. Sint. Nov. Istechniki Energ., Mezhdunar. Simp.*, 1994, pp 186-189, in Russian.

## AUTHORS' ABSTRACT

The ionization of O and H of doubly distilled water is the first step in the transmutation of both atoms as well as of their nuclei. The hypothesis is confirmed by results of experiments with other substances besides  $H_2O$ . The application of an electrostatic field and the role of heat in this process, as it applies to nuclear transformation (such as cold nuclear fusion), are discussed.

**UKRAINE - COLD FUSION MECHANISMS**

*Chemical Abstracts*, 13 Nov. 1995

V.I. Vysotskii (Kiev. Gos. Univ., Kiev), "Mechanisms of Barrier-Free Interaction in Cold Nuclear Fusion Based on the Phenomenon of a Nonequilibrium Fermi-Condensate for a Low-Fraction Ensemble and Pulsed Two-Deuteron Localization

in Microcavities of Optimal Form and Dimension," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 288-295, in Russian.

#### AUTHOR'S ABSTRACT

An hypothesis is presented and a mechanism is described for cold nuclear fusion with "removal" of the Coulomb barrier  $V_0$  in the presence of only 2 deuterons in a potential well. The essence of this phenomenon is based on satisfying the requirements of perturbation theory.

#### USA - PRACTICAL HELIUM MEASUREMENTS

*Chemical Abstracts*, 13 Nov. 1995

B.F. Bush, (Stanford Int. Sci. Res. Inst., Menlo Park, California), "Practical Aspects of Measuring Excess Heat and Production of Helium in Deuterated Palladium," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 349-355, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

#### AUTHOR'S ABSTRACT

For collecting samples of gas produced during electrolysis, metal flasks were used in experiments with  $\text{Pd}/\text{D}_2\text{O} + \text{LiOD}$  and  $\text{Pd}/\text{H}_2\text{O} + \text{Li OH}$  to minimize the effect caused by diffusion of He through the glass. In 5 controlled experiments where there was no output of excess energy, the mean value of the background concentrations of He in the author's system amounted to  $4.4 \pm 0.6$  ppb or  $5.1 \pm 0.77 \times 10^{13}$   $^4\text{He}$  atoms/500 mL. In five similar experiments where an excess energy output was observed, the measured concentration of He was greater than the background level in each of the experiments. Over the course of the last 3 years, three different laboratories were used for measuring the concentration of He in the different gas samples obtained during electrolysis in the author's experiments. The measurement of He in all three laboratories revealed an intensity of He output equal to  $10^{11}$ - $10^{12}$   $^4\text{He}$  atoms/s-W, i.e. 16.0-62.4 MeV of obtained energy per atom of  $^4\text{He}$ .

#### USA - LATENT HEAT

*Chemical Abstracts*, 13 Nov. 1995

K.H. Johnson (MIT, Cambridge, Massachusetts), "Disturbance of Jahn-Teller Symmetry and Hydrogen Energy in  $\gamma$ -PdD by 'Cold Nuclear Fusion' as an Accumulator of Latent Heat of Water," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 240-252, 14 refs, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

#### AUTHOR'S ABSTRACT

A review. The dynamic effect of Jahn-Teller, superconductivity and D-D fusion; the disturbance of symmetry, D-D recombination and the energy of H in PdD; the heat of "cold nuclear fusion" as a chemical latent heat (i.e. a heat after death); the equivalency of "excess heat" to latent heat of vapor production; light water in comparison with heavy water; additional experimental indications of the transformation  $^4\text{H} \rightarrow ^2\text{H}_2$ ; the importance of structural integrity of Pd crystal lattice; intensified cold nuclear fusion and superconductivity in  $\gamma$ - $\text{Pd}_{0.175}\text{Ag}_{0.25}\text{D}$ ; cold nuclear fusion in high- $T_c$  superconductors; and the accumulation of latent heat of water as a practical new H energy are discussed.

#### USA - HYDROGEN IN METALS

*Chemical Abstracts*, 30 Oct. 1995

R.A. Oriani (Dep. Chem. Technol. Mater., Univ. Minn., Minnesota), "Brief Review of Useful Information on Hydrogen in Metals," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 372-377, 15 refs, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

#### AUTHOR'S ABSTRACT

A review. Considering the fact that cold nuclear fusion is an unstable phenomenon and that the parameters needed for obtaining reproducible and constant results are difficult, it is important to know the state of H in metals and the dynamics of its evolution from a metal.

#### USA - COLD FUSION METHODS

*Chemical Abstracts*, 16 Oct. 1995

E. Storms (Los Alamos, New Mexico), "Methods for Producing Excess Heat by Electrolysis of an Electrolyte Based on  $\text{D}_3\text{O}$  with a Palladium Cathode," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 355-362, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

#### AUTHOR'S ABSTRACT

To produce excess energy during the use of  $\text{Pd} + \text{D}$ , 3 basic factors are important: the value of the D/Pd ratio  $>0.84$ , the presence of predetermined necessary impurities in the surface region of the Pd cathode, and the application of energy generated outside the system. When the relevant combination of these independent factors is obtained, the deuteride of Pd is transformed. The different nuclear reactions can develop as a result of a special state of the substance dependent upon

several unknown parameters. This special state of the substance at high temperatures is more stable than  $\beta$ -PdD. It is unlikely that the special state of the substance is simply another phase in the Pd-D system.

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#### USA - CATHODE SURFACE COMPOSITION

*Chemical Abstracts*, 16 Oct. 1995

J. Dash, G. Noble, D. Daiman (Univ. Portland, Oregon), "Changes in the Topography of the Surface and Composition of a Palladium Cathode Caused by Electrolysis in Acidified Light Water," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 378-390, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994, Engl.]

#### AUTHORS' ABSTRACT

A thin Pd cathode is destroyed (surface change) as a result of electrolysis in acidified ( $H_2SO_4$ ) light water. Local changes in the composition were observed, including the evolution of Cl and, possibly, Ag. The appearance of Ag can be caused by the transmutation as a result of neutron (from cold fusion) absorption. Pt is used as the anode.

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#### USA - TRANSMUTATION

*Chemical Abstracts*, 16 Oct. 1995

J.O'M. Bockris, R. Sundaresan (Dept. Chem., Texas A&M Univ., Texas), "Electrochemistry, Tritium, and Transmutation," *Kholodnyi Yad. Sint. Nov. Istochniki Energ., Mezhdunar. Simp.*, 1994, pp 274-281, 18 refs, in Russian. [also Cold Fusion Source Book, pub. F.I.C., 1994 Engl.]

#### AUTHORS' ABSTRACT

A brief description of cells and the calorimetric method for measuring the excess heat and a summary of the basic results of the T produced in electrolytic cells in connection with the search for cold nuclear fusion.

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### D. NEWS FROM THE U.S.

#### INTERNET - BASS, ADAMS, JONES

Robert Bass, Robert Adams, Steven Jones, quoted in "Surfing the Internet," *"Cold Fusion"*, 1996, no 15, pp 5-7.

Posted correspondences to each other, minus the seemingly endless headers, "discussing" cold fusion, commercialized fission, and comparative reality. Very interesting.

#### CALIFORNIA - CELL EXPLOSIVE POTENTIAL

*Chemical Abstracts*, 5 Feb. 1996

Brian D. Andresen, Richard Whipple, Armando Alcaraz, Jeffrey S. Haas, Patrick M. Grant (Forensic Sci. Ctr., Lawrence Livermore Nat. Lab., CA), "Potentially Explosive Organic Reaction Mechanisms in Pd/D<sub>2</sub>O Electrochemical Cells," *Chem. Health Saf.*, 1994, vol 1, no 3, pp 44-47.

#### AUTHORS' ABSTRACT

Forensic analysis of debris from the fatal explosion of an electrochemical cell showed the presence of unanticipated organic residues that could be quite important in the future design of cold fusion experiments. A hydrocarbon oil, likely a lubricant from machining the metal components of the electrolysis cell, was detected on the interior walls. In the electrolysis of heavy water, the headspace of the apparatus becomes enriched in oxygen, and conditions exist for explosive oxidation of small quantities of oil.

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#### CALIFORNIA - COLD FUSION REVIEWED

*Chemical Abstracts*, 8 Jan. 1996

James J. Hurtak, Patrick G. Bailey (AFFS Corp., Los Gatos, CA), "A Review of Research in Cold Fusion and its Impact on Energy Conservation," *Proc. Intersoc. Energy Convers. Eng. Conf.*, 30th, vol 3, 1995, pp 287-292.

A review with many references.

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#### CALIFORNIA - NUCLEAR INVOLVEMENT SOUGHT

*Chemical Abstracts*, 2 Oct. 1995

P.M. Grant, R.E. Whipple, F. Bazan, J.L. Brunk, K.M. Wong, R.E. Russo, B.D. Andresen (Lawrence Livermore Nat. Lab., CA), "Search for Evidence of Nuclear Involvement in the Fatal Explosion of "Cold Fusion" Experiment," *J. Radioanal. Nucl. Chem.*, 1995, vol 193, no 1, pp 165-169.

#### AUTHORS' ABSTRACT

Forensic analyses of debris from the fatal explosion of an electrochemical cold fusion cell at SRI International were conducted at LLNL at the request of Cal-OSHA. One study focused on the possibility of conventional nuclear reaction mechanisms contributing to the total energy inventory of the incident. Selected metal components of the electrolysis apparatus were subjected to nondestructive  $\gamma$ -ray spectrometry with high-sensitivity, low-background Ge detector systems. The anticipated analytes in these studies were radioactivation products potentially induced in the explosion residue by either

fast or thermal neutrons. The results of this study were negative within the temporal constraints of the incident and the analytical sensitivities of the instrumentation.

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## CALIFORNIA - ELECTRODYNAMIC COLD FUSION

Steve Lazarus, Chuck Bennett and Warren Cooley (Fullerene Fusion Group, CA), "Electrodynamic Cold Fusion," courtesy of the authors.

### AUTHORS' ABSTRACT

The inventors describe a hypothetical apparatus that is in the planning and construction stage. The completed apparatus will utilize high-loaded exohedrally deuterated carbon fullerene molecules that have been endohedrally impregnated with two or more atoms of lithium or its isotope, and delivered to a compression vortex by means of an aerosol jet of inert gas to produce a fusion rate significantly greater than the existing background (geological) fusion rate and therefore readily measurable in the laboratory.

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## ILLINOIS - ANOTHER REVISION FOR PHYSICS?

Malcolm W. Brown (Staff Writer), "Quark May Not Be the Tiniest, After All," *The New York Times*, 8 Feb. 1996, p A15.

### SUMMARY

Scientists at Fermilab reported that the quark may be made of smaller components of matter. If further experiments confirm theories about the quark's structure, major revisions would be needed in the theory of the standard model. Scientists spent over a year working on the data to ensure accuracy of their work, and now feel confident that something unexpected has happened. **Physicists cautioned, however, that "any claim about the presence or absence of new physics is not defensible."**

Because the data is inconsistent with currently accepted theory, revisions in the theory may be needed. The report of Fermilab does not cite a single discovery, but rather culminates a four-year program of experiments and analyses of data. The data has been submitted to two journals for review and publication--*Physical Review Letters* and *Science*.

The laboratory's accelerator spins counter-rotating bunches of protons and antiprotons to combined energies of 1.8 trillion electron volts. In high-energy proton-antiproton beam collisions, detectors frequently see high-energy jets flying away from the points of collision at right angles or near right angles from the direction of the colliding beams. Reportedly, there

are 120 percent more high-energy transverse jets than theory predicts. These results may mean that the surplus jets are being produced by collisions involving internal components of quarks as well as the whole quark itself. Another explanation could be that the collisions create an undiscovered particle similar to those that carry the "weak" nuclear force.

[Important: Current science doesn't have all of the answers. New discoveries challenge our theory of matter (and energy). If in this case, why not in low-energy nuclear reactions? --Ed.]

Summary by Dee Winter

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## MASSACHUSETTS - CAMBRIDGE SYMPOSIUM

Robert Horst, "Cambridge CF/New Energy Symposium Report," taken from Newsgroups:sci.physics.fusion.

Last Sunday, 20 Jan. 1996, I attended the Cold Fusion/New Energy Symposium put on by *Infinite Energy* magazine in Cambridge, Mass. I have been reading s.p.f since 1989, but have not posted frequently. This was my first chance to meet face-to-face with some of the people involved with cold fusion.

The conference was very different from the ones I usually attend. Much of it was tutorial in nature and was presented as video clips and summaries of various projects. Most of the presenters should be familiar to most of you - Eugene Mallove, Jed Rothwell, Mitchell Swartz, Chris Tinsley and Hal Fox. Also presenting were James Griggs and MIT professor Keith Johnson, Peter Hagelstein cancelled at the last minute. There were about 100 attendees, but they seemed to be mostly those who are following the field rather than those actively working on experiments.

It would have been good to have more presentations by those working directly on experiments, but I enjoyed most of the talks nonetheless. Here are a few highlights:

- There were strong rumors that CETI may soon be acquired by a large corporation for around \$1M. The name of the company was mentioned, but I will not pass it along until there is some confirmation.

- It is hard to see how there is any doubt left that CETI is getting excess heat. There are at least five separate groups who have seen excess - Patterson, Cravens, Miley (U. of Illinois), U of Missouri, and at least one corporation. There have also been two successful public demonstrations (SOFE and PowerGen). The larger number of groups eliminates fraud as possibility, and the large amount of excess eliminates instrument error (400 or more watts excess is hard to misplace, even with Radio Shack voltmeters). There were interesting rumors about new higher-temperature beads (ceramic

substrate?) and possible future demos (such as CF-powered dunebuggy).

- CETI has shown questionable business sense in their relationship with the media (first asking for media coverage, then refusing TV coverage) and in their overall strategy. They seem to have decided to try to perfect their beads more before offering them for sale. This seems to be a very risky strategy given that there would be an immediate market for the beads today. They may be left with nothing if someone else comes up with an even better process before they come to market.

-Jed showed an interesting picture of some used CETI beads. (They looked very beat up, with green corrosion showing through on some.) But the picture was of some older beads, and they may have improved on them now.

- Griggs gave an interesting talk, and I enjoyed talking with him later. He seems to be a competent no-nonsense engineer who just wants to find out exactly what is really going on in his machine. He reported on new contracts with NASA, TVA and Georgia Tech. All three will be carefully testing his machines and reporting the energy balance. Within 9 months we should get solid evidence on whether his machine is over unity or not. His most recent data still shows around 30-40% over unity.

- Tinsely gave a very entertaining account of his trip to Russia to investigate the Potapov device, and also talked about his ride on a scooter purportedly powered by an over-unity magnetic motor. He says that it has to be either real or fraud -it cannot be a mistake. I had previously completely discounted all the over-unity motor claims, but evidently the inventor has produced some very impressive magnets and multi-Farad capacitors that have been certified to work as claimed, so he does not seem to be your run-of-the-mill flake. Tinsely was not yet convinced (nor am I), but at least I will keep reading the reports now.

- There is a new device that gives a brilliant plasma discharge powerful enough to melt ceramic tile with only about 70 watts input. They showed an impressive video and passed around the melted tile. Wind tunnel tests have shown it to be about 10:1 over unity. The process has been replicated, but to my knowledge, the over-unity claims have not. This also will be interesting to watch.

Over all, I am glad to have diverted my business trip to attend the conference. It was a great opportunity to talk to people and get questions answered. In the last year I have gone from neutral to being convinced that at least some of these experiments are showing massive excess heat. The conference reinforced that position.

## MASSACHUSETTS - DEFINITIONS OF POWER RATIO

Mitchell R. Swartz (JET Technology, Weston, MA), "Four Definitions of Power Ratio Used to Describe Excess Enthalpy in Solid-state Loading Systems," courtesy of author, accepted for publication in *Journal of New Energy*, April, 1996.

### AUTHOR'S ABSTRACT

The exact definition for the amount of putative "excess heat" or "excess enthalpy" in some possible experiments remains unresolved. This paper describes four of the possible definitions for the power amplification factor ( $\Pi$ ) -- which relates the input power to the excess enthalpy actually generated. Issues including the Poynting vector, the thermoneutral potential, and the two types of power amplification factor corrections for gas flow are compared ( $\Pi_{Den}$ ,  $\Pi_{Num}$ ). Because of the distinctly different possible "definitions" of the power amplification factor and the recombination issue and the reasonable skepticism towards the possible existence of solid state fusion systems, and both for uniformity and simplicity, it is recommended that the absolute (minimum) power amplification factor ( $\Pi_{ABS}$ ) should be used to describe the quality of such putative fusion experiments.

## MARYLAND - EARLY PPC TESTING

*Chemical Abstracts*, 20 Oct. 1995

Bruce Klein (Bechtel Power Corp., Gaithersburg, MD), "Project: Cold Fusion Testing at Clean Energy Technologies, Inc.," *Cold Fusion*, no 9, pp 21-26.

### AUTHOR'S ABSTRACT

During the two days of testing [February 1995], a cell using Ni/Pd beads was tested with D<sub>2</sub>O electrolyte, and it produced excess power heat at a rate of ~130% (i.e. the cell was generating 30% more power than it was consuming). This confirmed the D<sub>2</sub>O claims of the patents. A cell using Ni/Pd beads was tested with light H<sub>2</sub>O electrolyte, and it produced excess heat at a rate of ~120%. This confirmed the light H<sub>2</sub>O claims of the patents. A cell using Ni/Pd/Ni beads was tested with light H<sub>2</sub>O electrolyte, and it produced excess heat at a rate of  $\leq 250\%$  (150% more power than it consumed).

## NEW MEXICO - SUCCESSFUL EXPERIMENTS

Edmund Storms (retired from Los Alamos National Lab., Santa Fe, NM), "How to Produce the Pons-Fleischmann Effect," *Fusion Technology*, vol 29, no 2, March 1996, pp 261-268, 37 refs, 1 fig.

## AUTHOR'S ABSTRACT

The conditions required for producing excess energy in PdD created in an electrolytic cell are described and reasons for their importance are discussed. Procedures are described that will increase the chance for success in producing an effect whose concept has been difficult to accept.

## AUTHOR'S CONCLUSION

Four major factors are important to achieve excess power using palladium electrolyzed in heavy water: an average D/Pd ratio above a critical value, a cell current density above a critical value, the presence of certain impurities in the surface region of the palladium cathode, and the application of externally generated energy. The closer the chemical conditions are to the ideal condition, the less external energy is required to initiate excess energy production. When a proper mixture of these independent conditions is achieved, a transformation is proposed to take place in the palladium deuteride that produces an SCM (special conditions of matter) in which the heat-producing reaction occurs. It is unlikely that the resulting SCM is simply another lattice structure in the pure Pd-D system. However, whatever structure the SCM is found to have, its chemical and mechanical properties will be unique.

Various nuclear reactions can be initiated in the SMC that depend on several additional variables. Because these variables are still not understood, some of the nuclear reactions have been more difficult to replicate than others. For example, tritium is produced only occasionally and with difficulty in normal cells. Tritium is seldom found in cells producing excess heat.

In contrast to statements made by some skeptics, a person does not have to be a believer to produce positive results. On the other hand, positive results will certainly produce a believer. Anyone reporting negative results should at least show that attempts were made to create and to measure the critical conditions described in this paper before dismissing the phenomenon.

**NEW YORK - WSJ TALKS ABOUT PPC**

Courtesy of Harry Dart

Jerry E. Bishop (Staff Writer), "A Bottle Rekindles Scientific Debate About the Possibility of Cold Fusion," *The Wall Street Journal*, Monday, Jan. 29, 1996.

Jerry Bishop reports that the electrolytic bottle filled with tap water and microscopic palladium-coated beads produces several hundred times as much power output in the form of heat as was input to start the reaction. The bottle is called the

Patterson Power Cell™, named after its inventor James A. Patterson.

Bishop writes that the Patterson Power Cell™ (PPC) is catching the interest of some engineers, chemists, and a few major companies such as Motorola. He also compares the bottle to the Utah cold fusion device produced by Martin Fleischmann and Stanley Pons at the University of Utah in 1989, "As with the Utah apparatus... the bottle produces an excess of power as it electrolyzes, or breaks down, water molecules into hydrogen and oxygen atoms. But, unlike the controversial and unpredictable Utah experiments, the Patterson Cell can be turned on and off seemingly at will."

Because the PPC consistently works, scientists will have the opportunity to manipulate the device to see if a nuclear reaction is involved in its processes. The electrodes in the Utah device were rods of palladium surrounded by coils of platinum wire. These rods were hung in "heavy" water in which the hydrogen is an isotopic form called deuterium. The Patterson Cell, however, is filled with microscopic plastic beads coated with a thin layer of palladium between two layers of nickel. It is also filled with ordinary water made of "light" [normal] hydrogen atoms.

In both devices, electrolysis releases hydrogen atoms which are soaked up by the palladium and/or nickel. Inside the metal an energy-releasing event is claimed to take place. Cold-fusionists would claim that the nuclear reaction taking place is the fusion of hydrogen atoms, a nuclear reaction that usually occurs at 50 million degrees.

The apparatus stands about four inches high and one inch in diameter and holds about three tablespoons of the tiny beads. Demonstrations of the device by Mr. Reding in Anaheim, CA lasted from 30 minutes to two hours. And those who observed the demonstrations say that, after subtracting the electricity needed to run pumps and fans, about 0.1 to 1.5 watts of power went into the cell itself, while the heat output was 450 to 1,300 watts.

Summary by Dee Winter

**NEW YORK - DYNAMIC COULOMB BARRIER**

*Chemical Abstracts*, 20 Oct. 1995

David Deak (USA), "Quantum Oscillations of the Dynamic Coulomb Barrier within a Deuterium-Loaded Palladium Lattice," *Cold Fusion*, 1995, no 9, pp 2-5, 7 figs.

## AUTHOR'S ABSTRACT

Coulomb forces established among adjacent isotopes of H, bound within a Pd lattice, are seen as a 3-dimensional barrier, and the extremely low probability of this barrier being

penetrated, are frequently adduced to dismiss the probability of cold fusion nuclear reactions. The introduction of other phenomena used as mechanisms to enhance the probability of these cold fusion reactions to occur, by establishing a dynamic Coulomb barrier undergoing oscillations which serves to invalidate logic to the contrary, is discussed. The author must look at things differently. The question is not which came first, the chicken or the egg. Rather, a chicken is an egg's only way of reproducing another egg! One should always ask: is there a better way to do it?

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### OHIO - SPACE POWER & PROPULSION

*Chemical Abstracts*, 27 Nov. 1995

Elliot B. Kennel (Space Exploration Assoc., Cedarville, OH), "Space Power and Propulsion Utilizing Anomalous Nuclear Reactions," *AIP Conf. Proc.* 1994, vol 301 (Proc. 11th Symp. Space Nucl. Power & Propul., Pt. 4), pp 1435-1439.

#### AUTHOR'S ABSTRACT

Highly speculative analyses are presented concerning the possibility of producing spacecraft power and propulsion using thermal power produced from anomalous nuclear reaction. These reactions, improperly referred to as cold fusion after their 1989 discovery by Pons and Fleischmann, probably produce heat via the decomposition of Pd nuclei such that the binding energy is released as kinetic energy of fission fragments.

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### OREGON - CATHODE MICROANALYSIS

*Chemical Abstracts*, 13 Nov. 1995

S. Miguet, J. Dash (Phys. Dept., Portland St. U., Portland, OR), "Microanalysis of Palladium Cathodes After Electrolysis in Acidified Heavy Water," *"Cold Fusion"* 1995, no 10, p 7.

#### AUTHORS' ABSTRACT

Chemical analyses of Pd 0.35 mm thick, used as cathodes for 25 hours and then inadvertently as an anode for 170 minutes, were performed with an energy-dispersive spectrometer attached to a scanning electron microscope. Localized concentrations of Al and Ti were found at surface protrusions or depressions on the lower part of the Pd where the metal dissolved. These and other results are consistent with the suggestion of Savvatimova et al., that the reason for the appearance of unexpected elements is nuclear fusion-fission reactions in the cathode.

### USA - PLATING HYDROGEN

*Chemical Abstracts*, 25 Dec. 1995

Arthur Wasserman (USA), "Plating Hydrogen," *Proc. AESF Annu. Tech. Conf.*, 1995, 82nd, pp 413-417.

#### AUTHOR'S ABSTRACT

Cathodic activation was examined with reference to cold fusion developments (controversy). Historically, cathodic activation has been used for plating preparation of passive (oxide) surfaces, e.g. Ni-Cr alloys, Nb and powdered metals. More recent results of work employing cathodic activation for preparing Al for plating are presented (e.g. process parameters, deposit adherence) suggesting a mechanism of oxide reduction. Data on the theory energy requirements to reduce the oxide are given. The Joule energy input for cathodic activation used in this work on Al was considerably less than the theoretical energy required to reduce the oxide. In the spirit of a common-sense Baltimore AESF approach, a simplified environmentally improved method of Cr plating on Al is discussed. The process is based on cathodic activation (reduction of surface  $Al_2O_3$ ) to achieve an adherent electrodeposit. The mechanism of cathodic H plating (evolution) has led the author to stay current with the work being reported outside the plating industry as cold fusion, which claims excess energy from cathodic  $H_2$ . Cathodic hydrogen activation (oxide reduction) can be used to achieve a simplified, reliable environmental friendly cycle to achieve functional and decorative chromium plating on aluminum. Cathodic hydrogen reduces  $Al_2O_3$  at possible elevated temperatures (e.g. 550°) preparing the surface for electrodeposition. Cathodic hydrogen presents some interesting possibilities.

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### VIRGINIA - NEW PERIODIC TABLE

R.A. Brightsen (Clustron Sciences Corp., Reston, VA), "Correspondence of the Periodic Table of Beta-Stable Nuclides with the Classical Periodic Table of Elements," will be published in *Infinite Energy*.

#### AUTHOR'S INTRODUCTION

The author has developed a new model of nuclear structure which is completely systematic, periodic and symmetric. This model is based on the three "building blocks" for beta-stable nuclei: a neutron-proton cluster (NP), a neutron-proton-neutron (NPN) and a proton-neutron-proton cluster (PNP). The author has been frequently asked questions by colleagues about how this new nuclear model relates to the Periodic Table of Elements, discovered by the Russian Mendeleev in 1869, and universally recognized by scientists throughout the world. This

paper will deal with that relationship, and will demonstrate that there is a one-to-one relationship between the two models.

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## E. NEWS FROM ABROAD

### CANADA - H ADSORPTION & ABSORPTION

*Chemical Abstracts*, 16 Oct. 1995

A. Lasia (Dep. Chem., U. Sherbrooke, Quebec, Canada), "Studies of the Mechanism and Kinetics of Hydrogen Adsorption and Absorption," *Pol. J. Chem.*, 1995, vol 68, no 5, pp 639-650, 38 refs.

#### AUTHOR'S ABSTRACT

Methods for the detection of hydrogen adsorption, hydrogen evolution and hydrogen absorption were reviewed. Direct detection of the surface coverage by adsorbed hydrogen is possible only for the UPD hydrogen and the surface coverage of the OPD hydrogen, involved in the hydrogen evolution reaction (HER), must be detected from the rate constants. However, detection of all the rate constants for the HER is possible only when their values are similar, which makes the detection of the surface coverage (OPD H) difficult. Studies of the HER on Rh, Ru and Ni based electrodes shows that it proceeds via Volmer-Heyrovsky mechanism and the main contributions to the electrode activity comes from the increase in the real surface area. Contrary to the HER, kinetics of the hydrogen UPD is very fast and difficult to detect. A general model of the hydrogen absorption in metals is proposed.

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### CHINA - TITANIUM LATTICE EXPERIMENTS

*Chemical Abstracts*, 2 Oct. 1995

Qingfu Zhang, Qingquan Gou, Zhenghe Zhu, Jianoming Luo, Fusheng Liu, Jiuxun Sun, Bingyou Miao, Anpei Ye, Xianmeng Cheng (Inst. Atomic Mol. Sci. High Temp. High Pressure, Chengdu U. Sci. Technol., Chengdu, PRC), "The Excess Heat Experiments on Cold Fusion in Titanium Lattice," *Yuanzi Yu Fenzi Wuli Xuebao*, 1995, vol 12, no 2, pp 165-169.

#### AUTHORS' ABSTRACT

Two groups of experts on cold fusion of Ti lattice are reported. A solution containing the D<sub>2</sub>O and a little H<sub>2</sub>O was used in the first group of experiments and any ascent of temperature in the Ti-rod after >10 days was not observed. The capacity of absorption H atoms into Ti rod is stronger than that of absorption D atoms. In the second group of experiments, the electrolyte solution is pure D<sub>2</sub>O solution, and the excess heat phenomena occur after 6 days. The ascent of temperature is 0.5° in the middle of Ti rod and 1.5° at its bottom. The x-ray

diffraction spectrum of Ti rod causes change. The surface of Ti rod becomes much more brittle after excess heat.

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### ESTONIA - HYDROGEN EVOLUTION REACTION

*Chemical Abstracts*, 16 Oct. 1995

J. Tamm, L. Tamm (Inst. Phys. Chem., U. Tartu, Estonia), "The Kinetics of the Hydrogen Evolution Reaction in Nickel Electrodes," *Res. Chem. Kinet.*, 1995, vol 3, pp 215-262, 122 refs.

#### AUTHORS' ABSTRACT

A review is given on the hydrogen evolution reaction on pure Ni. Ni is an electrocatalytic metal and is widely used as a cathode for water electrolysis. The Ni/solution interface is complicated and simplified model approaches are discussed which reflect the properties of the Ni electrode.

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### HUNGARY - TITANIUM & NIOBIUM DEUTERIDES

*Chemical Abstracts*, 25 Dec. 1995

J. Uchrin, R. Uchrin, K. Gerasimsov, O. Lomovski (URF Tech. Co., Budapest, Hungary), "Reactions of Titanium and Niobium Deuterides Under Intensive Mechanical Treatment," *Mater. Sci. Forum*, 1995, vol 179-181, pp 389-390.

#### AUTHORS' ABSTRACT

Transformation of titanium deuteride TiD<sub>x</sub> and NbD<sub>x</sub> under intensive mechanical treatment was carried out. Investigation of the gas phase in process of thermal decomposition of samples produced under mechanical treatment provides mass-spectrometry signals with m/e = 5 and 6.

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### INDIA - COLD FUSION THEORY

Afsar Abbas (Inst. Phys, Bhubaneswar, India), "Implications of Theoretical Ideas on Cold Fusion," *Cold Fusion*, 1996, no 15, pp 8-9.

#### AUTHOR'S ABSTRACT

A lot of theoretical ideas have been floated to explain the so-called cold fusion phenomenon. I look at a large subset to these and study further physical implications of the concepts involved. I suggest that these can be tested by other, independent physical means. Because of their significance, the experimentalists are urged to look for these signatures. The results in turn will be important for a better understanding, and hence control, of the cold fusion phenomenon.



**ITALY - NE213 DETECTION SYSTEM STUDY***Chemical Abstracts*, 19 Feb. 1996

A. Bertin, M. Bruschi, V.M. Bystritsky, M. Capponi, B. Cereda, S. De Castro, A. Ferretti, D. Galli, B. Giacobbe et al. (Dip. Fisica, U. Bologna, Italy), "A Monte Carlo Study of the Neutron Registration Efficiency of a Multichannel NE213 Detection System," *Nukleonika*, vol 40, no 2, 1995, pp 101-111.

## AUTHORS' ABSTRACT

Monte Carlo calculations of the registration efficiency of a 4-channel NE213 detector for 2.5 MeV neutrons are reported. The dependence of the efficiency on registration threshold as well as the influence of different substances placed between the neutron source and the scintillators on the efficiency value are also shown.

**JAPAN - "LATTICE QUAKE" MODEL***Chemical Abstracts*, 30 Oct. 1995

Yoshiaki Arata (Osaka U., Ibaraki, Japan), "Cold Fusion Caused by 'Lattice quake'," *Koon Gakkaishi*, 1995, vol 21, no 2, pp 43-47, in Japanese.

## AUTHOR'S ABSTRACT

A new model, named the Lattice Quake Model, is proposed, which demonstrates the existence of the cold fusion reaction and also verifies a tremendous excess energy fifty thousand times larger than chemical reaction energy, as generated in DS-Cathode. Cold fusion is caused by high energy deuterium similar to "hot" fusion.

**JAPAN - RELATIONSHIP BETWEEN HOT & COLD***Chemical Abstracts*, 5 Feb. 1996

Yoshiaki Arata, Yue Chang Zhang (Osaka U., Ibaraki, Japan), "Peculiar Relation Between Hot Plasma Fusion and Solid-State Plasma Fusion ("Cold Fusion")," *Koon Gakkaishi*, 1995, vol 21, no 4, pp 130-141, in Japanese.

## AUTHORS' ABSTRACT

A plentiful new excess energy was obtained in the Pd-deuteron system, by the authors, that exceeds 10,000 times over the chemical reaction energy by using the DS-cathode, is a reaction heat caused by the cold fusion, which is demonstrated by adopting a Latticequake model. If a tremendous energy concentration in an extremely localized zone within bulk lattice of cathode (where Latticequake generates and produces solid-

state energetic plasma) consists of high dense, high energy d-cluster with similar energy levels to successfully make hot plasma fusion, cold fusion inevitably occurs there. It means that comparison between hot and cold fusion can be discussed experimentally and theoretically under the same level.

**JAPAN - ABSENCE OF PHOTONS/NEUTRONS**

Hideo Kozima (Dep. Phys., Fac. Sci., Shizuoka U., Japan), "On the Absence of Photons with 6.25 MeV and Neutrons with 14.1 MeV in CF Experiments," *"Cold Fusion,"* 1996, no 15, pp 12-15, 19 refs.

## AUTHOR'S ABSTRACT

Riddles of the absence of 6.24 MeV photons and 14.1 MeV neutrons in the cold fusion phenomenon are investigated in the TNCF model [Trapped Neutron Catalyzed Fusion]. It is shown that the neutron and photon channelings through the crystal lattice make reactions with occluded deuterons on interstitial sites effective, and they disappear or stay within the crystal without going out to be detected.

**JAPAN - NEUTRON BURST IN V-D SYSTEM**

Hideo Kozima (Dep. Phys., Fac. Sci., Shizuoka U., Japan), "Evidence of Neutron Burst in Vanadium-Deuterium System," *"Cold Fusion,"* 1996, no 15, pp 15-18, 15 refs.

## AUTHOR'S ABSTRACT

Experimental results of neutron bursts from vanadium deuteride ( $VD_{1,2}$ ) are analyzed in the Trapped Neutron Catalyzed Fusion model for cold fusion (TNCF). It is shown that the experimental result is an indicator of the specific behavior of the low-energy neutrons in solids occluding deuterons.

**JAPAN - CIRCULAR TRACES PRODUCED***Chemical Abstracts*, 2 Oct. 1995

Takaaki Matsumoto (Dep. Nucl. Engr., Hokkaido U., Sapporo), "Extraordinary Traces Produced During Pulsed Discharges in Water," *"Cold Fusion,"* no 9, pp 17-21.

## AUTHOR'S ABSTRACT

Experiments are described of electrical discharge in  $H_2O$ , in which alternating current shots of  $\leq 100$  V were applied to wire electrodes of Pd and Pt. Various kinds of anomalous traces were observed on nuclear emulsions. Some of them were

similar to those observed in previous electrolytic cold fusion experiments. Extraordinary combined rings were newly observed, suggesting that tiny ball-lightning was hopping up and down between the nuclear emulsions. The mechanisms of forming the traces are discussed by the Nattoh Model.

[It is suggested that the pulsed discharges could produce high density charge clusters as investigated by Ken Shoulders. -Ed.]

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#### JAPAN - NEUTRON RADIOGRAPHIC ANALYSIS

*Chemical Abstracts*, 2 Oct. 1995

Masayoshi Tamaki, Hiroaki Matsunaga, Kohel Ohkubo, Kanji Tasaka, Yasushi Ikeda, Hisao Kobayashi, Kenji Yoneda, Shigenori Fujine (Dep. Nucl. Engr., Nagoya U., Japan), "Neutron Radiographic Analysis of Distribution of Electrotransported Hydrogen in Palladium," *Neutron Radiography*, (4) *Proc. World Conf., 4th*, 1992, pp 105-112.

#### AUTHORS' ABSTRACT

The neutron radiographic analysis of the H<sub>2</sub> in Pd metal is studied. A conceptual model for the field formation of the cold fusion system is proposed. Electrotransport of D<sub>2</sub> in Pd metal was considered to be a key factor of the occurrence of the highly densified H<sub>2</sub> in Pd and examined as simulation of the field formation of the condensed matter fusion. Analysis of H<sub>2</sub> distribution was carried out by the application of neutron radiography. Hydrogenation process of Pd was visualized. Effect of heat treatment of Pd metal was clarified. Electrotransported Pd hydride was observed by neutron radiography, and verified the effectiveness of H<sub>2</sub> densification by the force of electrotransport. The effective number of the electronic charge of H<sub>2</sub> in Pd was  $\sim +0.30 \pm 0.05$ . Microscopic metallurgical phase was visualized nondestructively by neutron radiography.

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#### JAPAN - H ABSORPTION IN ALKALINE SOLUTIONS

*Chemical Abstracts*, 5 Feb. 1996

Osamu Yamazaki, Yasuyuki Watanabe, Hideaki Yoshitake, Nobuyuki Kamiya, Ken-ichiro Ota (Dep. Energy Engr., Yokohama Nat. U., Japan), "Hydrogen Absorption in Pd Cathode in Alkaline Solution," *Denki Kagaku oyobi Kogyo Butsuri Kagaku*, 1996, vol 64, no 1, pp 62-68, in Japanese.

#### AUTHORS' ABSTRACT

The effect of alkaline cations on the hydrogen absorption in Pd cathode during the electrolysis in NaOH, KOH and LiOH solutions was studied by the electrochemical transient techniques. The H/Pd ratio increased quickly at the initial step of electrolysis in all electrolytes, and it gradually reached the

constant value in KOH and NaOH solutions. On the other hand, the ratio decreased after 60 hours of electrolysis in LiOH solution at 50 mA cm<sup>2</sup>, after 100 hours of electrolysis the ratio did not change significantly in all alkaline solutions. These values were very close to that in H<sub>2</sub>SO<sub>4</sub> solution. The characteristics of hydrogen absorption could not be explained by the hydrogen overpotential of Pd nor by the partial overpotential of Tafel step of H.E.R., but by the electrode potential decay curves of Pd after stopping electrolysis except in the case of LiOH solution. The hydrogen absorption in Pd cathode in alkaline solutions is related to the cold fusion reported by Fleischmann and Pons.

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#### POLAND - HARMONIC EMITTANCE

*Chemical Abstracts*, 16 Oct. 1995

K. Darowicki (Dep. Anticorrosion Protection Tech., Technical U. Gadansk, Poland), "Amplitude Analysis of Functional Harmonic Emittance of a Two-step Electrode Reaction," *Bull. Electrochem.*, 1995, vol 22, no 7, pp 333-342.

#### AUTHOR'S ABSTRACT

Fundamental harmonic emittance of a two-step electrode reaction was described. The dependence of fundamental harmonic emittance on the amplitude and frequency of an alternating current perturbation signal was detected. The kinetics of iron dissolution in sulfuric acid was studied. Dependencies were detected of high-frequency charge transfer resistance, low-frequency charge transfer resistance and the relaxation time of intermediate product adsorption from the amplitude of the alternating current perturbation signal. The results obtained confirm the correctness of the author's theoretical analysis of fundamental harmonic emittance of a two-step electrode reaction.

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#### POLAND - METAL CONFINEMENT FUSION

*Chemical Abstracts*, 13 Nov. 1995

Roman E. Sioda (Inst. Indust. Org. Chem., Warsaw-Zeran, Poland), "Metal Confinement Fusion Mechanism," *Cold Fusion*, 1995, pp 5-6.

#### AUTHOR'S ABSTRACT

The heat transfer arguments are further applied to develop a hypothetical hot spot model of the cold fusion phenomenon in deuterated metals. Presumably the actual plasma hot spot is surrounded by a coating of molten metal, the thickness of which is about equal to the radius of the spherical hot spot. The pressure of plasma in the hot spot is of the order of 1

Mbar. The idea of heat balance in the hypothetical hot spot mechanism is further developed.

#### POLAND - DEFINING "HOT SPOTS"

*Chemical Abstracts*, 2 Oct. 1995

Roman E. Sioda (Inst. Indus. Org. Chem., Warsaw-Zeran, Poland), "Estimation of Temperature and Radii of Hot Spots in Deuterated Palladium and Titanium," *"Cold Fusion"*, 1995, no 11, pp 19-21.

#### AUTHOR'S ABSTRACT

Cold fusion is a very interesting field of study which requires experience in many different subfields of physics and chemistry. Although cold fusion has now been established experimentally beyond any doubt, the mechanism of its initiation and operation is not yet agreed upon. Many hypotheses exist which try to explain its properties, such as its nonreproducibility. One hypothesis is the so-called hot spots hypothesis, which assumes that in blocks of deuterated metals, such as Pd and Ti, many small foci of actual hot fusion exist. The present paper develops this hypotheses further by making a heat balance between a hypothetical, spherical hot spot of deuteron plasma and the surrounding cold metal block, to which the plasma radiates heat according to the Stefan-Boltzmann Law. The performed analysis of heat transfer situation allows one to derive the equation,  $RT^4 = kt_m/\sigma$ , where R is the radius of the hot spot, T is the temperature of the plasma in degrees K, k and  $t_m$  are respectively the thermal conductivity and melting point ( $^{\circ}\text{C}$ ) of the metal, and  $\sigma$  is the Stefan-Boltzmann constant. A table of hot-spot radii is obtained for a range of possible plasma temperatures by substituting into the equation k and  $t_m$  values for Pd and Ti. By comparing the results of calculations with the TEM detection of sizes of hot spots in deuterated Pd, as obtained recently by A. Karabut et al. (1992), it is possible to estimate that the plasma temperature should be in the range of 50,000 to 140,000 K.

#### ROMANIA - POTENTIAL BARRIER

*Chemical Abstracts*, 16 Oct. 1995

Radu Gherghescu (Inst. At. Phys., Bucharest), "A Pocket in Cold Fusion Potential Barrier," *NATO ASI Ser., Ser. B.*, 1994, vol 334 ("Frontier Topics in Nuclear Physics"), pp 147-148.

#### AUTHOR'S ABSTRACT

The symmetrical cold fusion and fission barrier shapes are studied for nuclei in the range  $80 \leq Z \leq 120$  and  $Z \leq N \leq 200$ . The calculations are made within the macroscopic Yukawa

plus exponential model. The two fragments are supposed to be spherical.

#### RUSSIA - HYDROGEN-METAL INTERACTION

*Chemical Abstracts*, 16 Oct. 1995

M.S. Grilikhes, V.B. Bozhevol'nov (NPP Burevestnik, St.-Petersburg), "Interaction between Hydrogen and Metals in Electrochemical Processes in Electrolytic Solutions," *Zh. Prikl. Khim.*, 1995, vol 68, no 3, pp 353-365, in Russian.

#### AUTHORS' ABSTRACT

A review with 73 refs. is presented of information on the interaction of H, evolved during electrochemical reactions, with a number of metallic electrodes in the presence on their surfaces of thin hydrated oxide films. Mechanisms of the solid-phase proton transfer and the concept of protonic semiconductors are discussed.

#### RUSSIA - THREE TYPES OF CATION MOBILITY

*Chemical Abstracts*, 2 Oct. 1995

V.B. Kalinin (Inst Phys. Chem., Rus. Acad. Sci., Moscow), "Dipole Ordering, Ionic Conductivity, and Cold Nuclear Fusion: Three Types of Cation Mobility in the Orthophosphates  $\text{KTiOPO}_4$ ,  $\text{Na}_3\text{M}_2(\text{PO}_4)_3$  (M = Sc, Fe, Cr),  $\text{NaTh}_2(\text{PO}_4)_3$ ,  $\text{KD}_2\text{PO}_4$ , and Related Compounds," *Inorg. Mater. (Transl. of Neorg. Mater.)*, 1995, vol 31, no 5, pp 558-566, 44 refs.

#### AUTHOR'S ABSTRACT

As shown in earlier studies, crystals whose structures contain closely located positions statistically occupied by metal cations (split positions) may exhibit anomalies in physical properties, such as ferroelectric (FE) or antiferroelectric (AFE) ordering, superionic conduction (SIC), low thermal expansion coefficients, ultra-rapid nuclear relaxation, etc. For example, splitting of Na positions leads to FE ordering in low-temperature structures of  $\text{Na}_3\text{Sc}_2(\text{PO}_4)_3$  and  $\text{NaTh}_2(\text{PO}_4)_3$  and to AFE ordering in  $\text{Na}_3\text{Zr}_2\text{Si}_2\text{PO}_{12}$  (stoichiometric NASICON - one of the best three-dimensional superionic conductors). The coexistence of two types of split cation positions in  $\text{KFeFPO}_4$  is reported by Belokoneva et al. Later these splittings were shown to be accompanied by FE and AFE ordering.

The presence of split cation positions gives grounds to assume that the compound possesses properties associated with cation mobility. For example, based on information available in the literature, probably  $\text{CsReO}_4$  exhibits dipole ordering of the FE type, which was then confirmed by experiments. The splitting

of cation positions, accompanied by the formation of uncompensated statistical dipoles, was found in  $\text{Rb}_2[\text{La}(\text{NO}_3)_5 \cdot \text{H}_2\text{O}] \cdot 2\text{H}_2\text{O}$  and indicated that Rb ordering in this compound is of the FE type, which was confirmed later. The authors report an attempt to establish interrelations between various physical phenomena related to cation mobility. The authors discuss three manifestations of cation mobility in orthophosphates with split cation positions: dipole ordering of both FE and AFE types, superionic conduction, and cold nuclear fusion (CNF).

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### RUSSIA - DD FUSION IN SUPERCONDUCTORS

*Chemical Abstracts*, 8 Jan. 1996

A.G. Lipson, D.M. Sakov, B.F. Lyakhov, E.I. Saunin, B.V. Deryagin (Inst. Fiz. Khim., Moscow), "Generation of Nuclear DD Fusion Products in High-Temperature Superconductors  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}\text{D}_y$  in the Region of a Superconducting Phase Transition," *Zh. Tekh. Fiz.*, 1995, vol 65, no 8, pp 166-178, in Russian.

#### AUTHORS' ABSTRACT

The reproducible generation was observed of neutrons and T in ceramic samples of high-temperature superconductors of 1-2-3 type, saturated with D by an electrochemical method. The emission of neutrons of intensity  $n = 0.42 \pm 0.05$  neutron/s (~30 neutrons/transition) on samples with a D concentration of  $N_D \sim 2 \times 10^{20} \text{ cm}^{-3}$  is observed in the temperature range  $\Delta T = 88-93 \text{ K}$ , which agrees with the condition of a resistive superconducting transition and exceeds the value of the natural neutron background by 2-3 fold. In the temperature region lying outside  $\Delta T$ , an excess above background is absent. For samples of  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}\text{D}_y$ , the formation of T was also observed, the quantity of which increased in proportion to the number of heating-cooling cycles. The rate of T generation reached a value of  $4 \times 10^8$  atoms of T per transition. Possible mechanisms for initiation of the nuclear DD fusion reaction in deuterated high-temperature superconductors are discussed, related to (1) spontaneous polarization during the transition through  $T_c$ ; (2) screening of the deuterons orderly positioned in the lattice of the high-temperature superconductor during the formation of Cooper pairs (bipolarons), and (3) acceleration of the deuterons by the lattice during its polarization and during spallation of the samples.

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### RUSSIA - HETEROSTRUCTURE Pd/PdO:H(D)

*Chemical Abstracts*, 30 Oct. 1995

A.G. Lipson, V.A. Kuznetsov, B.F. Lyakhov, T.S. Ivanova, B.V. Deryagin (Inst. Fiz. Khim., Moscow), "Energy Yield of the Thermal Effect and Intensity of Nuclear Processes in the

Heterostructure Pd/PdO:H(D)," *Zh. Tekh. Fiz.*, 1995, vol 65, no 7, pp 68-80, in Russian.

#### AUTHORS' ABSTRACT

In the hypothesis concerning the presence in the heterostructure Pd/PdO:H(D) of discrete clusters of the condensed state of H(D), a calculation was made of the energy yield of the thermal effect and the intensity of generation of nuclear radiation. The interaction is described of a flux of compressional energy with a finely divided crystalline medium and cold nuclear fusion.

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### RUSSIA - NATURE OF EXCESS ENERGY

*Chemical Abstracts*, 25 Dec. 1995

A.G. Lipson, B.F. Lyakhov, V.A. Kuznetsov, T.S. Ivanov (Inst. Fiz. Khim., Moscow), "Nature of Excess Energy Liberated in a Pd/PdO Heterostructure Electrochemically Saturated with Hydrogen (Deuterium)," *Zh. Fiz. Khim.*, 1995, vol 69, no 11, pp 1989-1993, in Russian.

#### AUTHORS' ABSTRACT

A model was examined for the generation of excess energy (in comparison with that supplied during electrolysis) in a Pd/PdO heterostructure, saturated with H(D) by an electrochemical method. The model is based on the special properties presented by thin layers of water near the hydrophilic surfaces, and the feasibility is examined of the removal of the free energy of a capillary system on the surface of the heterostructure transformed into the H-bond energy of the structured water and deposited in the form of heat or plastic deformations in the Pd/PdO sample.

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### RUSSIA - ENERGY GENERATION MECHANISM

*Chemical Abstracts*, 13 Nov. 1995

Lev G. Sapogin (Dep. Phys., Techn. U., Moscow), "On an Energy Generation Mechanism in Unitary Quantum Theory," *"Cold Fusion"*, 1995, no 11, pp 10-12.

#### AUTHOR'S ABSTRACT

The possibility of local nonconservation of energy is discussed in the framework of the unitary quantum theory with regard to cold nuclear fusion and sonoluminescence.

Followed by a polemic response by Bill Page, pp 12-13.

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**R U S S I A - N U C L E A R - C H E M I C A L  
TRANSFORMATIONS***Chemical Abstracts*, 30 Oct. 1995

S.F. Timashev (Nauchno-Issled. Fiz.-Khim. Inst. im. Karpova, Moscow), "Nuclear-Chemical Transformations in the Condensed Phase," *Zh. Fiz. Khim.*, 1995, vol 69, no 8, pp 1396-1400, in Russian.

**AUTHOR'S ABSTRACT**

Cold nuclear fusion in D-saturated Pd can be detected by the nuclear chemical transformations with stages of electron capture. Two types of such processes were analyzed: electron capture by a deuteron with the formation of a hypothetical dineutron and a proton. In this case, the 3-phase matrix appears as a nonlinear active medium, undergoing structural reordering with the formation of a region (sub-microcracks) where nuclear cold fusion processes are realized.

**TAIWAN - MICROSTRUCTURAL STUDIES**

Swe-Kai Chen, Chi-Meen Wan, En-Hwei Liu, Shuh-Bair Chu, and Chi-Yung Liang (Nat. Tsing Hua Univ., Mater. Sci. Ctr., Taiwan), Liq-Ji Yuan (Inst. Nucl. Sci. Dept.), Chi-Chiao Wan (Dept. Chem. Engr.), "The Microstructure of Electrolytically Deuterium-loaded Palladium Rods," *Fusion Technology*, vol 29, no 2, March 1996, pp 302-305, 4 refs, 8 figs.

**AUTHORS' ABSTRACT**

Microstructural studies were conducted on palladium specimens that were taken from ambient-temperature heavy water and elevated-temperature molten-salt electrolytic experiments. Both scanning electron microscopy (SEM) and transmission electron microscopy (TEM) were used to investigate the surface and interior portions of these specimens. A subgrain structure could be observed by SEM on the surface along the longitudinal direction and on the surface taken from the cross section of the deuterium-charged specimen rod; the thermoelectrochemical etching process was consequently applied to the deuterium-charged specimen rod. A TEM bright field and selected area diffraction pattern technique verified that dislocation cells and subgrains exist in the deuterium-charged specimens. If cold fusion effects exist in the palladium microstructure, which consists of dislocation cells and subgrains, understanding the cold fusion phenomenon in the microstructure is necessary, and pursuant to this understanding, electrolytic experiments of a palladium rod in molten salt and of heavy water may be useful.

**AUTHORS' CONCLUSION**

We draw the following three conclusions from our research:

1. A microstructure of subgrain structure was found in electrolytic experiments of the surface of the deuterium-loaded specimen with room-temperature heavy water and elevated-temperature molten salt. This microstructure was also found in the TEC-etched cross-sectional surface of the specimens subsequent to deuterium-loading experiments of both heavy water and molten-salt electrolysis.

2. The TEM examinations show the dislocation cells and subgrain structure in the deuterium-loaded palladium specimen. The formation of the subgrain structure mentioned in conclusion 1 is suggested by the TEC effect on the dislocation cells and subgrains in the palladium electrode, whether or not the electrode is anodic (in molten-salt electrolysis) or cathodic (in heavy water electrolysis).

3. Cold Fusion effects have been usually considered to occur in the uniform deuterium-palladium lattice structure. However, this experiment suggests cold fusion effects, if any, occur in the nonuniform structure with dislocation cells and subgrain. Although the role of these structures in cold fusion effects needs to be further studied, one can certainly conclude that in studying cold fusion effects, the aforementioned microstructure with dislocation cells and subgrains must always be considered.

**F. PATENTS****NEW PATENTS ISSUED**

JP 07,287,085 (95,287,085), "Cold nuclear fusion apparatus," Toichi Chikuma. 31 Oct. 1995, 18 Apr. 1994, 5 pages.

The title apparatus is equipped with a means around an absorbent (such as Pd or ceramic) which absorbed a material (such as D) which starts the nuclear fusion to prevent the absorbed material from escaping from the absorbent. The means is a magnetic coil. The means may comprise an absorbent (which is a cathode), an electrical conductive layer (which is used as an anode) is formed around the absorbent via an electrical insulator, and voltage is applied. The efficiency of the nuclear fusion is improved.

JP 07,244,176 (95,244,176), "Cold nuclear fusion apparatus," Megumi Myake. 19 Sept. 1995, 4 Mar. 1994, 2 pages.

The apparatus is composed of putting D-absorbing Pd in a D bath and highly heat conductive Cu is connected to it.

JP 07,174,878 (95,174,878), "Porous metal cathode for cold fusion chain reaction, its manufacture, and electrolyte for reaction," Reiko Notoya. 14 July 1995, 29 Oct. 1993, 6 pages.

The cathode consists of a porous metal (voids 0.5-80 volume %) selected from a transition metal, Al, Sn, and stainless steel. The cathode is manufactured by shaping a metal powder with grain size 10nm -100 $\mu$ m at room temperature or high temperature and high pressure, or shaping and heating. The electrolyte comprises a hydroxide, carbonate, sulfate, phosphate, nitrate, halide, perchlorate, and/or B compound of an alkali metal, alkaline earth metal, Group IIIB elements or transition metals.

## G. SHORT ARTICLE FROM CORRESPONDENT

### NEWS FROM CHINA

By Professor Xing Zhong Li

Dept. of Physics, Tsinghua Univ., Beijing

March 2, 1996 there was a national symposium on "normal temperature nuclear fusion" in China. The terminology "Normal Temperature Nuclear Fusion" reflects the Chinese view about the "cold fusion" phenomena. Most of us believe that it is a kind of nuclear fusion reaction, but it happens in the "normal temperature." In the Chinese language, "Normal Temperature" means that it is not high temperature (as high as that in the "hot fusion"); it is not low temperature (as low as that in the cryogenics for low temperature super conductor). There were a series of national symposiums on "cold fusion" phenomena since 1989, but this one has a special task to review the progress of each Chinese group supported by a special fund in the past year. Since 1995 the State Science and Technology Commission, and the Natural Science Foundation in China set up a special fund to support this particular research. Every one knows that if this "cold fusion" phenomenon was true and reproducible it would alleviate the serious contradiction between the energy sources and the environment in the next century.

Nevertheless every one knows also that it is very difficult to reproduce this phenomenon for sure. There are a lot of Chinese scientists who do not think there would be any chance for this phenomenon. They have not looked at the data any more after November 1989, and they veto any proposal on this research. Since the Natural Science Foundation in China operates on the basis of vote, it has been very difficult for "cold fusion" research to win the vote. However, a few judicious senior scientists with high reputation became aware of this situation, and made a suggestion to the Natural Science Foundation in China and the State Science and Technology Commission. Based on this suggestion, a special fund was set up to support this research. Although the funding level is very low, it does help this research survive in China. This March Symposium is just for reviewing the progress after the establishment of this special fund in 1995.

There were about 30 conferees attending this symposium. Among them were the sponsors from the State Science and Technology Commission, and the Natural Science Foundation in China; a few senior scientists; the leaders of each research group; and some participants from each group. About one third of them were young graduate students and post-doctors. After the keynote speech, nine talks were delivered in the morning session and afternoon session. Each talk was limited to 30 minutes with 5 minutes for questions and answers. In the evening, a three hour session allowed full discussions in detail. The senior scientists addressed their comments on this symposium as well.

A major feature of this symposium was that the "excess heat" detection appeared in almost every research group. In the past five years, Chinese scientists paid more attention to nuclear signals (the charged particle detection, neutron, X-ray and Gamma ray). Since we had very little financial support, and we believed at that time that the nuclear signals should be commensurate with the "excess heat;" then, the nuclear methods had higher priority than the calorimetric methods. Gradually, we understood that "Thunder without Lightning" might be the feature of this "cold fusion" phenomenon, and the conventional nuclear signals might not be commensurate with the excess heat. So the calorimetric measurement might be the more suitable technique to identify this phenomenon. The preliminary results showed that there were some features which could be explained as the evidence of the "excess heat" (the turning point in the cooling curve, the sudden change of the temperature, etc.); however, more careful work is necessary before it becomes compelling evidence.

The electrical discharge work has been improved after the Nagoya conference. Although the neutron energy was found to be 2.45 MeV (normal), the yield of neutrons was still found to be higher than normal (abnormal). In order to reduce the yield of the normal neutron, a careful study on electrical discharge was done to identify a set of operation parameters with which the abnormal neutron yield became more apparent. A new set of Si-Li detectors was used to refine the X-ray detection. A fine structure of X-ray spectrum was found definitely, and the difference between the discharge in deuterium gas and in hydrogen gas has been identified (the energy and the intensity of the X-ray for Nb-D system was higher than that for Nb-H system).

An interesting "X-ray radiation after death" was found after shut down of the electrical glow discharge. It may last as long as 1,000 seconds. More careful work should be done before any possible explanation on this phenomenon is given. But the similarity to "heat after death" surprised all the attendees.

A careful theoretical study was done to analyze the X-ray spectrum. It was found that among the nearly 200 spectra,

about 100 spectra were abnormal. None of the applicable theories could explain the strange features in the X-ray spectrum. It was considered as evidence of the abnormality in the electrical discharge tube.

A calorimetric measurement was done with the electrical discharge tube. A sudden change of the slope of the cooling curve (temperature versus time) was found in a series of discharges with different electrodes and gases. Ni-H system had been studied with the emphasis on "excess heat;" however, a different conclusion was found. Although the Italian results had been reproduced, different explanations were given about this similar phenomenon. Based on the new explanation, the careful work proved that the "excess heat" in the Ni-H system disappeared.

In some institutions, the research had not reached the final stage to have some new data; but they expected that some new results might be obtained before the ICCF-6. Some institutions presented their plan for improving their previous results. The dynamics on the D-Pd interface were addressed, and the nano-meter material was suggested for future studies. The Ti-D system showed interesting results after analyzing the mass spectrum on the titanium surfaces above or under the heavy water level in an electrolytic cell. The ionic crystal was suggested for future studies. The new idea to use proportional counter technique in detecting the trace of the charged particles was interesting; and the idea of using pressurized fission reactor technique to run the electroanalytical cell had been realized in a laboratory with particular designing to guarantee the safety.

The gas-loading technique had been studied for more than five years in China in combination with the nuclear signal detection. At this symposium, a preliminary study on "excess heat" in a gas-loading system introduced interesting discussion. Since the "heat after death" phenomenon and other gas-loading experiments in Italy and in India revealed the possibility of observing the excess heat in a gas-loading facility, the advantages of being more cost effective, and safer in a gas-loading system became attractive. Besides, it had the feature of accumulating the reaction products in the reaction vessel which might be detected later, after a long period of operation. A pair of twin systems had been manufactured to see the difference between the deuterium-palladium system and hydrogen-palladium system. A sharp contrast had been observed already. More results were expected after the further operations.

One of the senior theoreticians presented his new results on the mechanism of "cold fusion" after intensive study for more than two years. His unique feature was that he collected the evidences through the careful scrutiny of astronomy and astrophysics. He solved the Schrodinger equation for the

three-body problem in a better way, and obtained the energy level for the proton-electron-proton system and for the deuteron-electron-deuteron system. He claimed that the 12.5 keV or 25 keV X-ray should be found as an evidence of the energy level in the p-e-p or d-e-d system, respectively. "Thunder without Lightning" was a natural result in his theory, because it was not a nuclear reaction at all. An additional 20 minutes was assigned to him by the session chairman to facilitate his presentation because he had more than 46 transparencies to be presented. His enthusiasm in this study was clearly observed by every attendee, although it was very difficult to agree or disagree with his point of view in such a short period. His results were similar to that of professor Baruit of Colorado University, but his derivation was different and more strict in mathematics.

Due to the time limit, not all of the results had a chance to be presented at this symposium, such as the preliminary study on sonoluminescence and "cold fusion", and the new theoretical result of resonance tunneling in a crystal lattice, the "self-lock" mechanism in the narrow resonance phenomenon, the comments on the Italian Ni-H system etc. Some preprints were distributed instead of the oral presentations.

The collaboration between institutions, the publication of internal reports in China, and the preparation for the ICCF-6 were discussed in the evening session also. Since additional funds were necessary for those subjects, no real solutions were found yet.

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## H. MEETINGS

### ICCF6

#### Sixth International Conference on Cold Fusion

will be held 13-18 October 1996

Hotel Apex Toya, Hokkaido, Japan

sponsored by

New Energy & Industrial Technology

Development Organization (NEDO) (Mr. K. Matsui)

Tel +81-3-35-08-8901

Fax +81-3-3508-8902

E-mail mac@iae.or.jp

The conference will consist of both oral and poster sessions covering experimental work and theory on the following topics:

- Excess Energy Phenomena in D<sub>2</sub>/Metal Systems
- Correlation Between Excess Energy and Nuclear Products
- Nuclear Physics Approaches
- Material Science Studies
- Innovative Approaches (Miscellaneous Phenomena)

**The Dead Line for abstracts is May 1996.** More information will be available in the second announcement, issuing in February 1996. Registration fee of ¥40,000 (about \$400) includes a banquet and proceedings. A technical tour to the NHE lab is scheduled, along with other professional and social events.

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### CALL FOR PAPERS

International Association of Science and Technology of Development (IASTED)

#### International Conference on

### HIGH TECHNOLOGY IN THE POWER INDUSTRY

4-8 June 1996, Banff, Alberta, Canada

The aim of this conference is to act as a forum for the exchange of information and experience on all aspects of high technology and advances in the power field.

Contact IASTED at (403) 288-1195 or Fax (403) 247-6851,  
E-mail: [iasted@istd.cuug.ab.ca](mailto:iasted@istd.cuug.ab.ca)

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### INTERNATIONAL SYMPOSIUM ON NEW ENERGY

#### An Exploration of "Free Energy" Generators

**April 25-28, 1996**

Denver Hilton South Hotel  
Denver, Colorado

#### CALL FOR PAPERS AND ABSTRACTS:

Scholarly papers are invited on any topic related to New Energy, and should include one or more of the following: Theories, designs, inventions, and research results. Abstracts of not more than 400 words must be sent as soon as possible to the address below. Consideration of abstracts cannot be assured if received after March 15, 1996. Authors will be notified as soon as possible if the paper is accepted for presentation. **Copy-ready manuscripts for proceedings are due April 1, 1996.**

SYMPOSIUM ON NEW ENERGY  
International Association of New Science  
1304 S. College Ave.  
Fort Collins, Co 80524  
Phone: 970-482-3731 Fax: 970-482-3120

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### INTERNATIONAL SYMPOSIUM ON CONSCIOUSNESS, NEW MEDICINE AND NEW ENERGY

Yomiuri Hall, Tokyo, Japan  
November 21-22, 1996

Dr. Shiuji Inomata is organizing a symposium to discuss and present research results in such broad topics as consciousness phenomena, holistic medicine, integration of Western and Eastern medicine, and new energy technology. Paramahansa Tewari has been chosen as the keynote speaker for the conference. Further information will be forthcoming.

Dr. Shiuji Inomata  
Sekigawa-cho  
Arai-shi, Nigata 944 Japan  
Tel/Fax +81 255 720558

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## Commercial Column

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The following companies (listed alphabetically) are commercializing cold fusion or other enhanced energy devices:

#### COMPANY: PRODUCT

**American Cold Fusion Engineering and Supply:** Information and troubleshooting for the fusion research and development industry. Sacramento, California. The president, Warren Cooley, can be reached at 916-736-0104.

**CETI (Clean Energy Technologies, Inc.):** Developers of the Patterson Power Cell™. Dallas, Texas. Voice (214) 458-7620, FAX (214) 458-7690.

**Clustron Sciences Corp.:** New energy research consulting and information. Contact: Ron Brightsen, 703-476-8731.

**ENECO:** Portfolio of intellectual property including over thirty patents issued or pending in cold nuclear fusion and other enhanced energy devices. Salt Lake City, Utah. Contact Fred Jaeger, Voice 801/583-2000, Fax 801/583-6245.

**E-Quest Sciences:** Exploring The Micro-Fusion™ process. Seeking qualified research partners for their sonoluminescence program. Contact Russ George, FAX (415) 851-8489.

**Fusion Information Center (FIC):** Research and development of new energy systems. The world's most complete resource depository for cold fusion research information, as well as other new energy research including zero-point energy; space energy research; electronic, electromagnetic, and mechanical over unity devices and more. We are the publishers for *Fusion Facts*, *New*



*Energy News*, and the *Journal of New Energy*. Voice 801-583-6232, Fax 801-583-2963.

**Holotec AG**, Clean Energy Technology, contact André Waser, Gen. Mgr., Bireggstrasse 14, CH-6003, Luzern, Switzerland. Phone 011 41-41 /360 4485, or Fax 011 41-41 /360 4486.

**Hydro Dynamics, Inc.:** Hydrosonic Pump, heat-producing systems using electrical input with thermal efficiencies of 110 to 125 percent. Rome, Georgia. Contact James Griggs, Voice 706/234-4111 Fax 706/234-0702.

**International Management Systems Co. (IMSC):** Technical project/program management assistance, and technology development and commercialization assistance. Contact Mark Harris or Richard Youngs, Phone 801-583-6232, Fax 801-583-2963, or Phone/Fax 801-255-3000.

**JET Energy Technology, Inc.:** Design and manufacture of  $\pi$ -electrode systems, calorimeters, and associated equipment and systems. Consulting regarding radiation, materials, and other scientific and engineering issues. Weston, MA. Contact Dr. Mitchell Swartz, Voice 617/237/3625. Fax 617/237/3625.

**Magnetic Power Inc.:** The Joint Venture partner with Sciex (UK) for Takahashi supermagnets and supermotors in North America. Sebastopol, CA. Contact Mark Goldes, Voice 707/829-9391, Fax 707/829-1002.

**Nova Resources Group, Inc.:** Design and manufacture ETC (Electrolytic Thermal Cell); EG (commercial power cogeneration module); and IE (integrated electrolytic system). Denver, CO. Call Chip Ransford, Phone (303) 433-5582.

**UV Enhanced Ultrasound:** Cold Fusion Principle being used for an ultrasonic water purifier. Hong Kong. FAX (852) 2338-3057.

Note: The Fusion Information Center has been acting as an information source to many of these companies. We expect to augment our international service to provide contacts, information, and business opportunities to companies considering an entry into the enhanced energy market.

## INFORMATION SOURCES

"*Cold Fusion*", monthly newsletter, edited by Wayne Green, 70 Route 202N, Petersborough, NH 03458.

*Cold Fusion Times*, quarterly newsletter published by Dr. Mitchell Swartz, P.O. Box 81135, Wellesley Hills MA 02181. Home Page: <http://world.std.com/~mica/cft.html>

*Cycles*, a R&D newsletter, published by Dieter Soegemeier, Editor, GPO Box 269, Brisbane, QLD.4001, Australia. Phone/Fax: +61 (0)7 3809 3257.

*Electric Spacecraft Journal*, quarterly, edited by Charles A. Yost, 73 Sunlight Drive, Leicester, NC 28748.

**Fusion Facts** monthly newsletter: Salt Lake City, UT 801/583-6232, also publishes Cold Fusion Impact and Cold Fusion Source Book. Plans on-line database access.

*Fusion Technology*, Journal of the American Nuclear Society publishes journal articles on cold nuclear fusion. 555 N. Kensington Ave., La Grange Park, IL 60525.

*Infinite Energy*, new bi-monthly newsletter edited by Dr. Eugene Mallove (author of **Fire from Ice**), P.O. Box 2816, Concord, NH 03302-2816. Voice: 603-228-4516. Fax: 603/224/5975 E-mail [76570.2270@compuserve.com](mailto:76570.2270@compuserve.com)

Institute for New Energy (INE), organization to promote and help find funding for new energy research.

Home Page: [www.padrak.com/ine/](http://www.padrak.com/ine/) contains many important scientific papers and current reports on all areas of research.

E-mail: [ine@padrak.com](mailto:ine@padrak.com) Salt Lake City, Utah.

Voice 801/583/6232, Fax 801/583/2963.

*New Energy News* monthly newsletter for INE, highlighting the research and development in the worldwide new energy arena. Edited by Hal Fox.

*Journal of New Energy*, quarterly, presenting papers representing the new areas of energy research, leading-edge ideas in the development of new energy technology, and the theories behind them. Published by the Fusion Information Center, Inc., for the Institute for New Energy. Editor: Hal Fox.

*Planetary Association for Clean Energy Newsletter*, quarterly, edited by Dr. Andrew Michrowski. 100 Bronson Ave, # 1001, Ottawa, Ontario K1R 6G8, Canada.

Now available: *Clean Energy Review*, a technical and scientific discussion prepared for the Canadian Environmental Assessment Agency's panel reviewing nuclear fuel wastes disposal. Discusses transmutation as a possible solution for nuclear waste disposal. \$5 U.S. and Canadian, \$7.50 other countries.

*Space Energy Journal*, edited by Jim Kettner & Don Kelly, P.O. Box 11422, Clearwater, FL 34616.

*21st Century Science & Technology*, P.O. Box 16285, Washington, D.C., 20041. Includes cold fusion developments.

The above list of commercial and information sources will be growing. New listings will be added as information is received. Send information to *FF*, P.O. Box 58639, Salt Lake City, UT, 84158.

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## BOOK NOTICE

ASTROLABIUM - on the subject of the Second Principle of Thermodynamics, announces the publication of "CRISIS OF A DOGMA - Kelvin and Clausius Postulates at the settling of accounts:" a book which explains the fundamental correction

which is necessary to apply to the Principle, and shows the way of obtaining energy from the environmental heat. The book is 165 pages, 83 figures and references. The price of the book is US\$ 30, including one 3½" floppy disk (containing programs to calculate ideal cycles and combinations of ideal cycles). Additional mailing expenses range from US\$ 10 to 17, according to modalities.

Contact: Maurizio Vignati

Via Buonarroti, 24

00053, Civitavecchia, ITALY

Fax 39-766-501648.

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