

FUSION facts

A Monthly Newsletter Providing Factual Reports On Cold Fusion Developments

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See page 25

A. ABC TELEVISION DISCOVERS COLD FUSION. . . MAYBE

By Jed Rothwell

EDITOR'S INTRODUCTION

On February 7 and February 8, 1996 ABC provided a story on the development and testing of the Patterson Power Cell™. This story was broadcast on "Good Morning America", and on "Nightline" on the 7th, and again on an early show on the 8th. In addition, the "Nightline" program interviewed Michael McKubre who heads up the cold fusion development program at SRI International in Menlo Park, California, and the retired John Huisenga, former co-chairman of the Energy Research Advisory Committee. Both McKubre and Huisenga have been consistent in their views on cold fusion. McKubre has consistently found evidence in the laboratory for cold fusion and Huisenga has consistently found academic reasons to ignore the experimental data and claim fiasco.

Following is the transcript of the ten minute "Good Morning, America" presentation on James Patterson's work:

Charlie: "Scientists discover a virtually limitless source of energy." Does it sound too good to be true? Maybe not. Our Science editor Michael Guillen is down in Washington this morning, having an exclusive look at an invention which has the potential of changing our lives. Michael?

Guillen: Thanks, Charlie. It's a device that its inventor says produces a hundred times more energy than it consumes. Now let me say right off the bat that lots of ideas come across my desk, that claim to be the energy source of the future, but this one is different. For one thing, the inventor has a distinguished track record. Second, the invention itself has been issued a patent by the US Patent Office. Furthermore, and this is key,

independent scientists now claim to have reproduced the results, and major corporations like Motorola are taking a serious interest in it.

So, is this potentially the greatest discovery since electricity? Since fire? Good question! Have a look.

[3 brief cuts of other interviews]

James Reding, president Clean Energy Technologies Inc:
We've been able to reliably demonstrate a device that produces a thousand times more energy out than you put into it.

Prof. George Miley, University of Illinois: What could it do as far as an electric power plant or a water heater in your home? There are so many applications that the mind can run wild.

Dr. C. Quinton Bowles, University of Missouri: It would be a true source of power for use by the general public.

Guillen: It's hard to believe, but here's what is causing all the commotion. It doesn't look like much - some wires, some salt [sic] water, and at the core of it: this container of tiny beads. But these are no ordinary beads, and the man who invented them is no ordinary person.

[Interview with James Patterson in his laboratory]

Patterson: I started making beads back in 1953.

Guillen: 74-year-old James Patterson looks about as homespun as his device, working out of a large garage in Sarasota, Florida, with more than a hundred patents to his credit. Patterson had always planned on being a chemistry professor but in 1951, while working for his PhD at Berkeley, Dow Chemical made him an offer he couldn't refuse.

Patterson: Dow hired me before I graduated, got my degree. And they paid me more than what I was going to get after I got my degree. So . . .

Guillen: It was during his years with Dow that Patterson invented a recipe for making tiny beads, beads so perfectly round that few people in the world can duplicate them.

Patterson: If I have a claim to fame, [laughs] I'm a good cook for little beads. Well, this is my storage area, and - it's almost like a library of what I've done.

Guillen: Over the years, Patterson's beads have been used in many different ways: in water purifiers, cosmetics, even as the 'talcum powder' inside surgical gloves.

Patterson: I'm better than a millionaire.

Guillen: Just because of the money you got from . . .

Patterson: . . . little beads! [laughs] I have converted alchemy . . . little beads into gold!

Guillen: Talk about alchemy! In creating his new energy device, Patterson took his regular beads, and coated them with thin layers of copper, nickel and palladium; a metal sandwich Patterson claims works like magic.

Patterson: This is the guts of it, this is creating heat.

Guillen: So this is water that you have flowing through it. [Feels outlet tube.] Oh, it is hot. Pretty warm! Yeah. And how much energy is this little cell putting out, compared to what it's consuming?

Patterson: One watt. It's consuming only one watt, and it's putting out two hundred watts.

Guillen: You know this sounds too good to be true?

Patterson: [Laughs] Well, it may sound too good to be true, but if you'll only look, the scientific evidence is here. I mean, you're looking at it. I mean, you can't disavow what you're looking at.

[Cut back to studio]

Charlie: Michael, we're looking at it, but how's it working?

Guillen: Well, you know, even for a scientist like myself, you can't just tell by looking or even touching it. That's where the other scientists come in -- at the University of Missouri, the University of Illinois, and at Motorola. They have tested dozens of these devices, **they say they can't get it not to work**. Every time you plug it in, the doggone thing just produces all this excess heat.

Charlie: But what's going on, scientifically?

M.G.: Well, that's the big mystery. It's either, you know, an ordinary chemical reaction that's not behaving the way we expect it to, or some kind of a nuclear reaction. But there is no radioactivity that's evident from this thing so it doesn't appear to be a nuclear reaction. It's neither one nor the other, so it really is just a genuine mystery right now.

Charlie: Michael, what you are telling me is you have a scientific experiment that is producing a certain result and you have no idea how it's producing it.

Guillen: Yeah, but that's not unusual. I mean, very often times you run across something in the laboratory and you go 'wow! Look what it's doing' long before you understand why it's doing that.

Charlie: Michael, this sounds like going back to 19 . . . what? 1989.

Guillen: 1989

Charlie: This sounds like the cold fusion debate again.

Guillen: Yeah. Remember the University of Utah, the whole cold fusion thing? Superficially this looks like cold fusion, in the sense that you have electricity passing through an electrode that is emersed in salt water. But there are essential technical differences. First of all the beads make this cell absolutely unique. That wasn't like the original cold fusion device. The other thing is that the original cold fusion device used heavy water, this uses ordinary water. So, it remains to be seen whether this is just a variation of the old cold fusion experiment or whether this is genuinely a new phenomena.

Charlie: Is there an anticipation that what is taking place here in microcosm can take place in a macro situation where you can produce a tremendous amount of energy?

Guillen: Now **that** is going to be the key question. If the scientists at the independent universities and corporations continue to verify that this device seems to work, the next question is going to be: can you scale it up from this laboratory model into something that can be mass produced, and be cost efficient. **Because we have heard other alternative energy like wind power and solar power, they also sound great but they have never become cost efficient.** That's going to be the big question in the future.

Charlie: You keep saying 'if this works.' You are telling me that a number of scientists have been able to make it work. There are also a bunch of other scientists who are saying this is just crazy.

Guillen: Yeah. The scientists are really cautious because of the old cold fusion flap six years ago. They want to be real cautious. The question is here, you have to measure the temperature differences, how much of the heat is putting out . . . is being put out by this device. That requires you to use thermometers of various kinds. They are just double, triple and quadruple checking those thermometers to make sure they are not misreading them. But they are all saying yes, this seems to work as advertised. So it's potentially historic.

Charlie: Five seconds: are you a believer or not?

Guillen: Uh, talk to me in about two or three months. We're going to be updating this.

Charlie: All right. Michael thanks. Michael will have more of this on Nightline, tonight.

EDITOR'S COMMENTS

Michael McKubre can always be counted on to provide a reasoned and accurate account of the results of his experimental findings in cold fusion. In the interview on

"Nightline," he made specific comments about the numerous laboratories in the world that have been and are providing experimental data showing that whatever the phenomena is, the energy produced cannot be explained by chemical reactions.

In contrast, John Huizenga demonstrated that he was unfamiliar with Patterson's work and made uninformed comments about light water experiments. In the final question, Huizenga was asked if he believed it (Patterson's results) to be possible. Huizenga replied essentially as follows: "I believe everything is possible. In science we must have reproducible experiment that everyone can replicate. [This device] must have X-rays. We do not see the nuclear products. We do not see X-rays. If they want to spend their time [the scientists working on cold fusion] that is the choice they have to make.

This editor and Huizenga strongly differ on the true role of Science. Science should be involved with discovery. Any new discovery made by competent, trained, men of science (or by backyard experimenters with replication) should receive commendation and investigation. Science investigates many non-replicable phenomena, such as sun spots, eclipses, a strange organism washed up on the beach. When, in defense of current models of reality, educated men find it necessary to condemn the experiments, verbally assassinate the discoverer(s), or deride any new information, **those actions cannot be called scientific.** True science is discovery, **not frantic defense of the status quo!** Truth should be defended. New Truth should be examined, not attacked.

B. NEWS FROM THE U.S.

CALIFORNIA - ELECTRON CATALYZED FUSION MODEL

R.T. Bush (Phys. Dept., Cal-State Poly. Univ., Pomona, CA; ENECO, Inc., Salt Lake City, Utah), "The Electron Catalyzed Fusion Model (ECFM) Reconsidered with Special Emphasis Upon the Production of Tritium and Neutrons," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 339-342, 13 refs, 2 figs.

AUTHOR'S ABSTRACT

The author's ECFM ("Electron Catalyzed Fusion Model") first presented at the ICCF-4 re-examined with special reference to the production of tritium and neutrons. The model is of some interest in that it is the first model to fit excess power-vs-loading fraction data of McKubre et al. (SRI International/EPRI) and, independently, that of Kummatsu et al. (IMRA). Of special note is that the peak of the theoretical curve of tritium production versus loading fraction, which is related to that for neutrons by a branching ratio scaling factor, is found to at a fractional D/Pd loading of approximately 0.825, which is in good agreement with the empirical value of 0.83 announced at the ICCF-5 by Iwamura et al (Mitsubishi)

for both tritium and neutrons. It is of interest then that this theoretical ECFM tritium production curve arises essentially from purely statistical mechanical considerations involving the deuteron occupation of the three-dimensional interstitial lattice, rather than arising from the details of a specific nuclear mechanism. The model shows why tritium is ordinarily not observed when excess heat is being observed. For the neutron-to-triton branching ratio a theoretical lower limit $(r/R)^{12}$ results (r is the protonic charge radius and R is the deuteronic charge radius) yielding a value of 2×10^{-9} in agreement with the empirical value of 2×10^{-9} for the neutron-to-triton branching ratio.

CALIFORNIA - IMPURITIES AND EXCESS HEAT

R.T. Bush (Dept., Cal-State Polytechnic Univ., Pomona, CA; ENECO, Inc., Salt Lake City, Utah), "Model for the Impurity Promotion and Inhibition of the Excess Heat Effects of Cold Fusion," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 343-346, 10 refs, 1 fig.

AUTHOR'S ABSTRACT

A theoretical model describes impurity promotion and inhibition of the heavy water and light water excess heat effects of cold fusion based upon the influence on the magnetic properties of Pd and Ni, respectively, of alloying with different metals. For Ni (light water case), promoters, in increasing order of efficiency, are predicted to be Cu, Zn, Al, and Sn. Inhibitors, in increasing order of efficiency, are predicted to be Co, Fe, and Mn. Ag, Au, and Cu are indicated as promoters in the case of Pd (heavy water case). Empirical evidence impacting the model will be presented in another paper in these Proceedings.

CALIFORNIA - THERMODYNAMIC PROPERTIES

S. Crouch-Baker, M.C.H. McKubre and F.L. Tanzella (Energy Res. Centre, SRI International, CA), "Some Thermodynamic Properties of the H(D)-Pd System," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, Pg 4431-440, 25 refs, 3 figs.

AUTHORS' ABSTRACT

In any discussion of the origin, measurement or description of the anomalous power producing process which occurs in connection with the electrochemical loading of deuterium into palladium, knowledge of the thermodynamic behavior of the system is clearly of importance. More particularly, since the formation of highly loaded palladium is implicated as a

necessary (but itself insufficient) condition for the observation of anomalous power, thermodynamic considerations relating to the attainment of high loadings are of interest. Here, it is intended to review, at a general level, those aspects of the thermodynamic nature of the H(D)-Pd system, both equilibrium and non-equilibrium, which appear to bear most directly, on the question of excess power production in relation to the attainment of high loadings.

CALIFORNIA - CONCERNING REPRODUCIBILITY

M.C.H. McKubre, S. Crouch-Baker, A.K. Hauser, S.I. Smedley, F.L. Tanzella, M.S. Williams, S.S. Wing (SRI International, Menlo Park, CA 94025 (USA)), "Concerning Reproducibility of Excess Power Production," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April, 1995, Monte-Carlo, Monaco, pg 17-33, 15 refs, 4 figs, 5 tables.

AUTHORS' ABSTRACT

An apparent irreproducibility in the production of an, as yet, anomalous excess power from Pd cathodes electrochemically loaded with D can be associated with irreproducibility in the attainment of several necessary starting conditions. Of these, the threshold loading (D/Pd atomic ratio) has received the most attention. A statistical analysis is presented of the results of 176 experiments intended to test the means of establishing reproducible control over D/Pd loading. A set of variables are examined, and procedures identified which permit the attainment of loading above the threshold necessary for excess heat production.

Calorimetric results from two experiments are presented and analyzed. A mathematical function is identified which correlates closely with the time evolution of excess power. An important element of this correlation is the measured rate of change of the cathode resistivity. We have interpreted the resistance change as indicating the presence of an oscillation or "breathing" of the cathode loading induced by a flux of deuterons through the cathode/electrolyte interface.

The observed functionality of excess power with deuteron flux above a loading threshold, conforms closely with theoretical predictions.

CALIFORNIA - OPEN CALORIMETER RESULTS

Melvin H. Miles (Chem. & Mat. Branch, R.& Tech. Div., Naval Air Warfare Center Weapons Div., China Lake, CA), "The Extraction of Information From an Integrating Open Calorimeter in Fleischmann-Pons Effect Experiments,"

Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 97-104, 11 refs, 3 figs, 4 tables.

AUTHOR'S ABSTRACT

Our first 5 months of investigating the Fleischmann-Pons effect in 1989 experiments produced no significant excess enthalpy. The November 1989 report of the Energy Research Advisory Board to the U.S. Department of Energy listed China Lake with MIT, Caltech, Hatwell, and other laboratories as one of the groups NOT observing excess heat. Later experiments using palladium from another source (Johnson-Matthey), however, produced up to 30% excess power and 1,400 kJ of excess enthalpy. This amount of excess enthalpy is difficult to explain by any chemical reaction. Numerous experiments have shown that there is no recombination of the D₂ and O₂ electrolysis gases when fully-submerged palladium cathodes are used. Recombination can occur when palladium particles are exposed to the gas phase. In this case, our experiments prove that this recombination can be readily detected and easily corrected. In general, only about 20% of our experiments have produced measurable amounts of excess enthalpy. The cathode material used is apparently a major factor since successful experiments cluster around Johnson-Matthey supplied palladium.

CALIFORNIA - THE FUTURE OF EPRI RESEARCH

Thomas O. Passell (Nuclear Power Group, Electric Power Res. Inst., Palo Alto, CA), "Charting the Way Forward in the EPRI Research Program on Deuterated Metals," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 603-618, 13 refs, 11 figs, 1 table.

AUTHOR'S ABSTRACT

Over six years have elapsed since the first announcement by Fleischmann, Pons and Hawkins of the observation of excess heat from palladium heavily loaded with deuterium. The EPRI program began in April, 1989, and has continued to the present time attempting to replicate the claimed excess heat and determine its source. Under conditions difficult to achieve, some 16 separate experiments have successfully reached that goal out of some 35 major attempts. The conditions found necessary for an observation of excess heat were found to be at least three in number: 1) atomic loading ratio (D/Pd) > ~ 0.9; 2) initiation time of 8 to 23 days; 3) current density > 0.1 amperes per cm² of cathode area. A fourth condition suggested by the results of a recent experiment is that the FLUX of deuterium across the palladium metal surface must be above some threshold value. No definitive source for the

excess heat has been yet robustly determined, but measurable helium-4 has been observed in the cell vapor space in a few cases. The major evidence that the heat may be from nuclear reactions is its magnitude - some 10 to 100 times larger than any known chemical reaction. The objective of the continuing effort is focussed upon identifying the source of the excess heat. Sonic cavitation at a Pd-D₂O interface has apparently produced both He-4 in the vapor phase as well as apparent excess heat. This research has identified a huge matrix of possible experiments to confirm or refute various hypotheses on the source of the heat. To acquire sufficient resources to explore this matrix requires, in my opinion, a definitive signature of a nuclear reaction connected with the production of heat. Then and only then, with the promise of a potential energy source of almost unlimited size, will the necessary research funds be forthcoming.

GEORGIAN - COLD FUSION GENERATOR OUTPUT

Robert Indech and Ruvin Karshenboym (IPD Assoc., Norcross, GA), "Optimization of Output in a Cold Fusion Generator," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 367-371, 8 refs.

AUTHORS' ABSTRACT

Progress has been made in the production of excess heat from a cold fusion generator based upon the combination of deuterium ions within a metallic matrix. Drawing from fundamental considerations, this paper identifies for optimization those quantities and methods which would tend to increase the heat production. An analogy to hot fusion is presented, followed by theory of the PONS cell. Methods to increase fusion output are introduced with a detailed theoretical analysis of the effective kinetic temperature generated for deuterium ion under an electric field in a porous material.

INDIANA - IMPROVED FORMULATIONS

Yeong E. Kim and Alexander L. Zubarev (Dept. of Phys., Purdue Univ., West Lafayette, IN), "Uncertainties of Conventional Theories and New Improved Formulations of Low-energy Nuclear Fusion Reactions," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 293-314, 46 refs.

AUTHORS' ABSTRACT

We examine uncertainties of conventional theoretical estimates for low-energy nuclear fusion cross-section $\sigma(E)$ and fusion rate $\langle\sigma v\rangle$. Using new formulations based on the optical

theorem and the radial distribution function, we derive new improved formulae for $\sigma(E)$ and $\langle\sigma v\rangle$. Our results of the optical theorem formulation for $\sigma(E)$ indicate that a near cancellation of the Gamow factor can occur if the imaginary part of the effective nuclear interaction in the elastic scattering channel has a very weak component with a long finite interaction range. Uncertainties of conventional estimates of the electron screening effect for $\sigma(E)$ are also examined and a new alternative formulation is proposed. Finally, based on a solution of three-body Schrödinger equation and the optical theorem formulation, we derive a new formula for three-body fusion cross-section and rate and compare its predictions with conventional estimates and also with the recent experimental data for three-deuteron fusion reaction.

MASSACHUSETTS - NEUTRON TRANSFER

Peter L. Hagelstein (Massachusetts Inst. of Tech. Res. Lab. of Electronics, MA), "Update on Neutron Transfer Reactions," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 327-337, 14 refs, 2 figs.

AUTHOR'S ABSTRACT

We discuss progress in our studies of two new basic physical mechanisms that may be relevant to recent experiments that exhibit anomalies in metal hydrides and deuterides.

Anomalous energy transfer from phonon modes to the constituents of a lattice may occur through frequency-shifting phonon modes that are highly excited. The energy transfer is $\Delta E = N\hbar\delta\omega$, where N is the number of phonons in the modes, and $\delta\omega$ is the frequency shift of the phonon modes. A phonon laser can provide a large N ; a finite frequency shift can be produced in a lattice with a phonon bandgap and with impurity vacancy modes that occur in the phonon bandgap. We propose that exothermic desorption in a metal hydride pumps a surface phonon laser.

We propose that neutrons can hop in a lattice, by analogy with electron hopping. Neutron hopping in crystalline silicon has been analyzed, and found to be unobservable; neutron hopping in lighter nuclei should lead to observable gamma emission. Neutron hopping in lighter nuclei, combined with anomalous energy transfer, is a candidate route to account for anomalous excess heat and tritium production.

MASSACHUSETTS - NEW ENERGY SYMPOSIUM

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

Last Sunday, Jan 20, 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:

- 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 three successful public demonstrations (ICCF5, 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).

- Jed Rothwell 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.

- Tinsley 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 [the Takahashi super magnet 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 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 [introduced by Hal Fox and Gene Mallove] 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 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.

MARYLAND - DEVELOPMENT APPROACH

Bruce Klein (Columbia, MD), "A Development Approach for Cold Fusion," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 589-596.

AUTHOR'S ABSTRACT

A plan is presented for investigation and development of the cold fusion effect, ultimately leading to implementation of commercial devices. The plan represents a methodical approach for identifying and addressing theoretical, scientific, engineering and economic concerns.

The plan is presented from the perspective of a large architect/engineering corporation which performs work in established energy industries and which is not currently involved in cold fusion. The plan consists of a number of phases designed to establish the corporation's level and method of involvement in the field.

The phased plan provides a number of decision points; at each decision point a commitment to a higher level of funding is made on the basis of additional information which has been generated by the plan to that point. In this way the corporation can control its financial outlay, yet funding is appropriate so that pursuit of the plan is not hampered.

MICHIGAN - RADIATIONLESS FUSION

James T. Waber (Research Professor, Physics) and Ouliana L. Egorova-Cheesman (Chem. Eng., Mich. Tech. Univ., Houghton, MI), "Boson Condensation Involved in Radiation-less Fusion: II Spinodal Decomposition of Palladium/Palladium Deuteride System and the Andreev Effect," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 469-482, 22 refs, 10 figs.

AUTHORS' ABSTRACT

The palladium/palladium deuteride system has an immiscibility gap between two face centered cubic solutions which is the necessary condition for spinodal decomposition. The interface between the α and β phases will contain a high concentration of dislocations due to the coherency strains of the lattice prior to the actual separation and formation of the β phase, as deuterium is introduced.

Deuterium atoms will be trapped in these dislocations and the atomic diffusion significantly reduced.

The requirements of the Fujita-Watanabe theory of high temperature superconductivity are (a) near complete filling of the Brillouin Zone and nearby pockets and (b) optical phonons to bring about Cooper pair formation. The connection to Radiation-less fusion, which has been more commonly known as Cold Fusion, was proposed by Waber and de Llano. It involves a small modification of the FW theory, namely that a Cooper pair of charged bosons replaces the electron holes of the Bardeen-Cooper-Schrieffer theory. Since deuterons are bosons, the dissociative separation i.e., ionization of the D atoms into two deuterons and two electrons mediated by an optical phonon (*à la* Yukawa) is reasonable. Further the requirements of the FW theory are met by Palladium dueteride.

OREGON - HEAT WITH PLATED LAYERS

G. Noble, J. Dash, M. Breiling, and L. McNasser (Phys. Dept., Portland State Univ., OR), "Electrolysis of Heavy Water with a Palladium and Sulfate Composite," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 136-139, 7 figs.

AUTHORS' ABSTRACT

It appears excess heat can be produced during the electrolysis of heavy water with a palladium and sulfate composite. Experiments seem to show that when this composite is coated on Platinum, and used as a cathode, excess heat similar to that generated with solid Pd results.

TEXAS - PPC CALORIMETRY

Dennis Cravens (ENECO, Vernon Region Junior College, TX), "Flowing Electrolyte Calorimetry," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 79-86, 10 refs, 4 figs, 1 table.

AUTHOR'S ABSTRACT

When the specific heat and flow rate of the electrolyte are known, the thermal output of cells using circulating electrolytes can be determined. An independent evaluation of the "Patterson Power Cell™" was conducted using the circulating electrolyte as a heat transfer medium. This allows for real time measurements and alteration of the electrolyte. The cell was found to give measurements consistent with claims of excess power. Suggestions for the improvement of the calorimetry are given. A simplified version of the system was demonstrated during the first 3 days of the International Conference on Cold Fusion - 5 (ICCF-5) and made available to those requesting its examination.

UTAH - PATENT COMMERCIALIZATION

Frederick G. Jaeger (President of ENECO, Univ. of Utah Res. Park, Salt Lake City, UT), "A Model for Commercialization Utilizing Patents," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 597-602, 3 figs.

NO ABSTRACT

VIRGINIA - ION BAND STATE THEORY

T.A. Chubb and S.R. Chubb (Oakton Intl. Corp., Arlington, VA), "The Ion Band State Theory," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 315-326, 22 refs, 1 fig.

AUTHORS' ABSTRACT

We have previously explained how the occupation of ion band states by hydrogen (H) and deuterium (D) in palladium deuteride PdD and possibly Ni can result in radiationless fusion. The explanation includes a number of assumptions about the governing conditions associated with the process. As a consequence of these assumptions we predicted important excess heat phenomena (loading requirements, by-products, etc.) of Cold Fusion (CF) that were subsequently observed. Although the governing ideas are based on mainstream solid state physics ideas, the underlying theory "seems" to have

"evaded" a number of potential problems that have bothered many people concerning CF. As we have explained recently, as a result of these solid state physics effects, discontinuous changes in momentum and singularities in the effective kinetic energies associated with H or D that may occur through the occupation of ion band states provide a means for eliminating the phenomena that seemingly are omitted by the theory. In this paper we clarify the origin of these effects and their relationship to questions that have been raised associated with our treatment of the Coulomb barrier.

C. NEWS FROM ABROAD**CHINA - RADIATIONLESS HEAT**

Xing Zhong Li (Dept. of Phys., Tsinghua Univ., Beijing, China, current address: Dept. of Chem., Univ. of Hawaii, Honolulu), "Solving the Puzzle of Excess Heat Without Strong Nuclear Radiation," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 285-292, 18 refs, 1 fig.

AUTHOR'S ABSTRACT

Five experimental evidences show that the excess heat is from a nuclear source with a life-time of 10^4 seconds. This life-time is shown to be related to the barrier penetration number, θ , in terms of the resonance penetration theory. The boson nature of the deuteron ion (D^+), and the deuteron energy band structure in lattice play the critical roles in filling the corresponding narrow resonance energy level. Prof. J. Huizenga's challenge of three miracles is answered, and "excess heat" without strong nuclear radiation is a reasonable phenomenon. It predicts: (1) there must be a critical loading ratio; (2) the greater the grain size and the activation energy are, the better the reproducibility.

CHINA - BIOLOGICAL EFFECTS

T.V. Prevenslik (Discovery Bay, Hong Kong), "Biological Effects of Ultrasonic Cavitation," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 539-546, 8 refs, 3 figs.

AUTHOR'S ABSTRACT

Cavitation energy in a nearly evacuated bubble is shown to not likely reside in the thermal state of the water molecule. In a spherical bubble compression and until the bubble assumes a pancake collapse shape, a temperature increase does not occur in the bubble gas because the mean free path likely exceeds the bubble diameter. The subsequent collapse of the pancake

shape to liquid density occurs with only a negligible volume change so that the temperature increase for compression heating of bubble gases is insignificant. Even near liquid density, a temperature increase does not occur as the energy transfer by molecular collisions is in the adiabatic limit for both vibrational and rotational modes. Instead, the IR radiation energy density present within the bubble is increased as required to satisfy standing wave boundary conditions with the bubble walls in the direction of collapse. For biological tissue in an opaque environment, bubble collapse is found to increase the 5-10 μm IR thermal radiation at ambient temperature to about 3-5 eV that is capable of dissociating the water molecule and forming the chemically reactive hydroxyl radical. Hence, the biological effects of ultrasonic cavitation are proposed to be caused by the chemical reaction of the organisms with the excited electronic states of dissolved oxygen and water molecules.

FRANCE - AlLaO_3 DOPED DEUTERIUM

Jean-Paul Biberian (Dept. de Phys., Fac. des Sciences de Luminy, France), "Excess Heat Measurement in AlLaO_3 Doped with Deuterium," Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 49-56, 5 refs, 5 figs.

AUTHOR'S ABSTRACT

We show evidence that solid state electrolytes can be used successfully in "cold fusion" experiments. We describe in this work that LaAlO_3 single crystals loaded with deuterium produce excess heat up to 10 times the amount of electrical power applied. No significant amount of neutrons has been detected.

FRANCE - MEASURE EXCESS ENERGY PER ATOM

J. Dufour, J. Foos, J.P. Millot (Shell Research/CNAM Labs. des Sciences Nucleaires, Paris, France), "Excess Energy in the System Palladium/Hydrogen Isotopes Measurement of the Excess Energy Per Atom Hydrogen," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 495-504, 6 refs, 8 figs, 1 table.

AUTHORS' ABSTRACT

A search for the products of fusion reactions that could be triggered by sparking in hydrogen isotopes, was carried out. No signatures above background were found. On the contrary, the excess energy production was confirmed, in the simple system hydrogen/palladium. The formation of a tightly bound

state of the hydrogen (deuterium) atom is hypothesized to explain these results.

FRANCE - POSITIVE FEEDBACK MODE

M. Fleischmann (IMRA S.A., Science Center, Valbonne, France), "More about Positive Feedback; More about Boiling," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 140-151, 10 refs, 8 figs.

AUTHOR'S INTRODUCTION

We have already described elsewhere some of the principles which have guided our search for the generation of high rates of excess enthalpy generation at elevated temperatures, say, up to the boiling points of the electrolytes. One of these principles has been the prediction that the partial molar enthalpy of absorption of hydrogen (or deuterium) in palladium will become positive at the high charging ratios ($X = \text{D/Pd}$) required for excess enthalpy generation.

Although a transition from exothermic to endothermic absorption is probably not a necessary condition for achieving excess enthalpy generation at elevated temperatures, such a transition will certainly facilitate the achievement of high charging ratios. For example, increases of temperature will then themselves lead to increases in X and thereby in the rates of excess enthalpy generation. These are the conditions required for the development of "positive feedback" and, in this paper, we report on two lines of investigation which have indicated the presence of these effects. We then outline the way in which our understanding of this phenomenon has guided our investigation of excess enthalpy generation at elevated temperatures.

FRANCE - EXPERIMENTERS' REGRESS

M. Fleischmann (IMRA S.A. Science Center, Valbonne, France). "The Experimenters' Regress," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 152-161, 11 refs, 5 figs.

AUTHOR'S INTRODUCTION

At the beginning of any new and controversial field of investigation, we cannot tell which of the following two statements is true:

A. "Positive" conclusions are correct; "negative" results are due to bad experimentation.

B. "Negative" conclusions are correct; "positive" results are due to bad experimentation.

This is the basis of the Experimenters' Regress, a concept drawn from the field of the Sociology of Science. As scientists, we also need to examine the possible validity of the following statement (as well as its corollary):

C. Key "negative" conclusions have been due to incorrect evaluations/interpretations; the results in fact point to "positive" conclusions.

If statement C applies, then the Experimenters' Regress should be seen to be substantially broken (Sociologists would not agree with this view because their judgements are made in terms of the public perception of fields of study).

Sociologists of Science also express the following view:

D. A discovery is not made at a single point in time.

As Scientists, we might again wish to add some further statements, such as:

E. Interpretations are not completed at a single point in time.

F. Interpretations (and calibrations) are affected by our knowledge of the system being studied.

FRANCE - WITH QUANTUM MECHANICS

Alexandre LaForgue (France), "Cold Fusion and Quantum Mechanics," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 635-638, 9 refs.

AUTHOR'S ABSTRACT

One explain the cold fusion by a permanent state of collision between the deuterons of the double layer. Each one collides with the total mass of the network with an energy surpassing the potential barrier. This state is determined by the dimension of the quantum mechanical path of deuterons under the Bohr-Heisenberg limit. The discussion of the quantum path itself could be bettered by a new model of quantum mechanical wave corpuscle.

FRANCE - EVIDENCE FOR THEORY

Michel Rambaut (France), "Experimental Evidences for the Harmonic Oscillator Resonance and Electron Accumulation

Model of Cold Fusion," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 623-626, 10 refs, 1 fig.

AUTHOR'S ABSTRACT

Cold Fusion outside any substratum is again considered from the Harmonic oscillator resonance and electron accumulation (HOREA) model point of view. If one adds Fractal theory, one gets a more straight forward agreement with the experimental growth of fusion burst after the apex I of a fast current, and varying approximately like the tenth power I^{10} . Then it is shown that the model could account for the solar neutrino discrepancy. The paper ends up by a short reminder of two experimental data, in agreement with the HOREA point of view: experimentally noticed Electron accumulations, and Top-Table soft X-ray Laser operation.

FRANCE - PARTICLE-WAVE-DUALITY

Olof Sunden (France), "Centripetal de Broglie Wave Fields Connected to Particles at Rest Explain Cold Fusion and the Particle-Wave-Duality," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 379-382, 7 refs, 1 table.

AUTHOR'S ABSTRACT

The controversy about Cold Fusion "CF" depends on the fact that the phenomena discovered are not in agreement with present physical theories, like QM and QED. The aim of this paper is to show that a Time-Space-Oscillation "TSO" connected to matter is a physical perspective able to explain CF and the Particle-Wave-Duality, even able to propose technical means for further development. According to this perspective a particle - even at rest - is joined to a real, centripetal TSO. a 'de Broglie oscillation,' instead of a mathematical Schrödinger wave function. This TSO-field propagates with velocity c toward a focus, where the particle is created as a flickering wave vertex, that can push an instrument trigger. Particles and nuclides including their Coulomb barriers, thus become endowed with phase dependency and a centripetal wave field, that can interfere in slits. This explains the Particle-Wave Duality and why the Coulomb barrier can be tunneled under certain phase conditions. This TSO-perspective further hints at nuclear reactions of a 'centripetal' kind different from those based on 'translational collisions,' described by present high energy physics. It is worth consideration because it gives accurate accounts for physical constants, particle masses and charges, while the nuclides appear as focal resonance-shells, able to arrange according to Mendelevjev.

INDIA - RAPID LOADING/UNLOADING

A.B. Garg, R.K. Rout, M. Srinivasan, A. Shyam, L.V. Kulkarni (Neutron Phys. Div.), T.K. Sankaranarayanan (Chem. Engineering Div., BARC, Bombay, India), "Protocol for Controlled and Rapid Loading/Unloading of H₂/D₂ Gas in Self Heated Pd Wires to Trigger Nuclear Events," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 461-464, 3 refs, 4 figs.

AUTHORS' INTRODUCTION

It has now been established that during electrolysis of LiOD using Pd cathodes, a threshold loading ratio of at least 0.85 needs to be achieved before excess heat production can be expected. However, for emission of neutrons and tritium and possibly charged particles and transmutation products to much lower D/Pd ratios, in the region of 0.4 to 0.7 appears to be adequate. This has been independently corroborated in a variety of electrolytic and gas loading experiments. It is not so much the magnitudes of the steady state loading ratio, but rather creation of non-equilibrium conditions which facilitates rapid migration/transport of deuterons within the Pd lattice that seems to be required. With this in view a systematic study has been undertaken using electrically self-heated 0.125 mm dia Pd wires in H₂/D₂ atmospheres to optimize the conditions under which rapid loading/unloading of H₂ or D₂ can be achieved. Pd wire was of 99.9% purity and was procured from Lieco Industries, USA.

INDIA - TRITIUM GENERATION IN NICKEL

T.K. Sankaranarayanan, M.B. Bajpai, D.S. Gupta (Chem. Eng. Div., BARC), M. Srinivasan (Neutron Phys. Div., BARC, Bombay, India), "Evidence for Tritium Generation in Self-heated Nickel Wires Subjected to Hydrogen Gas Absorption/Desorption Cycles," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 173-179, 10 refs, 3 figs, 2 tables.

AUTHORS' ABSTRACT

The loading characteristics of hydrogen gas in electrically self-heated nickel wires was investigated with a view to maximize hydrogen absorption and thereafter "trigger" it to generate anomalous excess heat as reported by Focardi et. al in early 1994. The nickel wires were found to absorb substantial quantity of hydrogen following several alternate cycles of absorption/desorption. But calorimetric studies conducted with the system so far indicate that we have not succeeded in triggering excess heat generation. However, on dissolution and counting using standard liquid scintillation techniques, a number of hydrogen loaded nickel wires were found to contain tritium in the range of 3 Bq to 2333 Bq. This finding corroborates the detection of tritium in light water solutions

electrolyzed by nickel cathodes reported by authors first at ICCF-3 (Nagoya, 1992) and again at ICCF-4 (Hawaii, 1993), confirming the occurrence of anomalous nuclear reactions in nickel-hydrogen systems.

INDIA - TiD_x RESISTANCE VARIATION

V.K. Shrikhande (Technical Phys. & Prototype Engineering Div., BARC, Bombay, India), T.C. Kaushik, S.K.H. Auluck, A. Shyam and M. Srinivasan (Neutron Phys. Div., BARC, Bombay, India), "Preliminary Results on the Variation of Electrical Resistance of a TiD_x Wire with Deuterium Concentration," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 465-468, 9 refs, 4 figs.

AUTHORS' ABSTRACT

Experiments have been carried out to study the variation and reproducibility of electrical resistance as a function of the deuterium concentration (D/Ti) in titanium wires. Deuterium loading is carried out in a series of steps by passing a D.C. current to ohmically heat the sample for some time in D₂ gas until a measurable quantity is absorbed. After every loading, the wire resistance and decrease in the gas pressure are measured *at room temperature* using a four probe resistance meter ($\pm 0.2\%$ accuracy) and an oil manometer respectively.

Significantly, it is observed that an apparently simple property like electrical resistance is not easily reproducible. The preloading heat treatment and residual gases in high vacuum appear to play an important role on the behavior of the resistance in TiD_x. The preliminary results also suggest that this property may not be useful in estimating the deuterium content in titanium.

ITALY - EXCESS POWER PRODUCTION

L. Bertalot, F. De Marco, V. Violante (ENEA, Dip. Energia, Settore Fusione, Centro Ricerche Frascati, Italy), A. De Ninno (ENEA/INN/FIS, Frascati), A. La Barber (ENEA/INN/NUMA, Frascati), F. Scaramuzzi (ENEA/ERG, Frascati), "Power Excess Production in Electrolysis Experiments at ENEA Frascati," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 34-40, 3 refs, 3 figs,

AUTHORS' ABSTRACT

Continuing the research activity on heat excess detection during the electrolysis of heavy water with palladium (Pd) cathodes, previously reported at ICCF3 and ICCF4, new experiments have been performed with success. In one of them it was also possible to correlate the power excess

production with other parameters of the experiment: its description is the subject of this communication.

ITALY - SEARCH FOR HELIUM-4

E. Botta, T. Bressani, D. Calvo, C. Fanara (Dipt. di Fisica Sperimentale dell'Univ., and I.N.F.N., Italy), R. Bracco, V. Cela, U. Ferracin (FIAT COMPES, Torino, Italy), F. Iazzi (Dipt. di Fisica del Politecnico and I.N.F.N, Torino, Italy), "Search for ^4He Production from Pd/D₂ Systems in Gas Phase," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 233-240, 12 refs, 6 figs, 1 table.

AUTHORS' ABSTRACT

We describe the performances of an apparatus consisting of a cell containing a Pd sheet loaded with D₂ in gas phase coupled to a high resolution Q-mass spectrometer. The loading ratio $\alpha = \text{D/Pd}$ is increased by applying a constant electric field along the Pd sheet. α is carefully measured by means of the electric resistance variation and of the thermodynamic parameters. In one experiment a signal corresponding to ^4He production was observed.

ITALY - PULSED ELECTROLYSIS

Francesco Celani, Antonio Spallone, Paolo Tripodi, Alessandra Petrocchi, Daniele Di Gioacchino, (INFN, Lab. Nazionali di Frascati, Italy), Paolo Marini, Vittorio Di Stefano (EURESIS, Roma), Sandro Pace (Dipt. di Fisica, Univ. di Salerno, Italy), Alfredo Mancini (ORIM S.R.L., Italy), "High Power/ μs Pulsed Electrolysis Using Palladium Wires: Evidence for a Possible "Phase" Transition Under Deuterium Overloaded Conditions and Related Excess Heat," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 57-68, 9 refs, 5 figs.

AUTHORS' ABSTRACT

In this paper we describe an electrolytic experiment aimed at reaching high deuterium concentration gradients in palladium wires, using the electromigration effect.

We describe the selection criteria of experimental parameters and we show results of our loading and calorimetric measurements. These tests reveal that a high mean value of D/Pd has been reached in a short time and that there is a correlation between an anomalous heat emission and an electric resistivity "transition" of the overloaded palladium.

ITALY - PULSED ELECTROLYSIS

Francesco Celani, Alessandra Petrocchi, Antonio Spallone, Paolo Tripodi, Daniele Di Gioacchino, Misa Nakamura, (INFN, Lab. Nazionali di Frascati, Italy), Paolo Marini, Vittorio Di Stefano (SKITEK, IRI, Pomezia, Italy), Giuliano Preparata, Marco VerPELLI, (Dipt. di Fisica, Univ. di Milano, Italy), "Numerical Simulation of Deuterium Loading Profile in Palladium and Palladium Alloy Plates from Experimental Data Obtained Using μs Pulsed Electrolysis," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 407-410, 6 refs, 2 figs.

AUTHORS' ABSTRACT

Various palladium cathodes have been studied to determine the influence of metallurgy and surface treatment on deuterium loading. In this paper we apply a numerical solution to the appropriate differential equation to calculate the time dependent local deuterium concentration inside the plates. We use experimentally determined deuterium coefficients for the α , β and γ phases.

We find the highest concentration gradient in the case of oxidized samples.

ITALY - DEUTERIUM CHARGING BEHAVIOR

Francesco Celani, Antonio Spallone, Paolo Tripodi, Alessandra Petrocchi, Daniele Di Gioacchino (INFN, Lab. Nazionali di Frascati, Italy), Paolo Marini, Vittorio Di Stefano (SKITEK, IRI, Pomezia, Italy), Marco Diociaiuti (ISS, Roma, Italy), Alfredo Mancini (ORIM S.R.L., Italy), "Study of Deuterium Charging Behavior in Palladium and Palladium Alloy Plates, Changing Surface Treatments, by μs Pulsed Electrolysis," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 411-418, 2 refs, 7 figs.

AUTHORS' ABSTRACT

A systematic study about deuterium loading in palladium has been performed. Palladium cold worked plates and palladium alloy plates have been used as comparison. A proper plate surface oxidation has been performed and anomalous absorption rates have been measured. A high peak current (15 A), short width pulse (duration 1 μs) electrolysis technique has been used to test all cathode plates and it is visible [observed] that this technique permits to reach very high D/Pd loading values (around 1/1 or even more for palladium). At the beginning of the loading, in close relation with the anomalous absorption rate, a bump of excess heat has been measured in two similar oxidized surface palladium plates.

All these tests show that the loading is completely reproducible.

ITALY - STUDY OF NUCLEAR REACTIONS

W.J.M.F. Collis (Italy), "Nuclear Reactions of Cold Fusion - A Systematic Study," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 627-630, 17 refs.

AUTHOR'S ABSTRACT

A computer is used to make an exhaustive search for simple nuclear reactions between naturally occurring isotopes with a view to identifying possible primary cold fusion reactions and materials which might support theoretical models. We discuss the difficulties in producing neutrons and tritium in light water experiments.

ITALY - NEUTRON OBSERVATIONS

Lino Daddi (Accademia Navale, Gruppo Fisica, Leghorn, Italy), "Neutrons Observations in Cold Fusion Experiments," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 259-264, 39 refs.

AUTHOR'S ABSTRACT

This report is a review of the most convincing observations of neutrons in Cold Fusion history up to recent experiments in which neutrons were so numerous and long lasting so as to allow activation of thermal detectors. Lately neutrons were observed also by using natural hydrogen. A more complete review is published elsewhere. [L. Daddi, "Neutrons in Cold Fusion Experiments," Proceedings of the 4th Workshop on the Status of Cold Fusion in Italy, Siena 1995, Ed. B. Stella.]

ITALY - COLD FUSION IN CONTEXT

Giuliano Preparata (Dipt. di Fisica, Univ. di Milano, INFN, S'ezione di Milano, Italy), "Setting Cold Fusion in Context: A Reply," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 265-284, 19 refs, 7 figs.

AUTHOR'S ABSTRACT

This talk consists of three parts: the first on the "pathological" nature of Cold Fusion (CF) phenomena, the second on a wide

theoretical effort based on the new ideas of QED coherence in matter, and the third replying to explicit criticisms to my work.

ITALY - DEAD-TIME FILTERING TECHNIQUE

A. Shyam, M. Srinivasan, T.C. Kaushik and L.V. Kulkarni (Neutron Phys. Div., BARC, Bombay, India), "Observation of High Multiplicity Bursts of Neutrons During Electrolysis of Heavy Water with Palladium Cathode Using the Dead-time Filtering Technique," Proceedings of the Fifth International Conference on Cold Fusion 9-13 April 1995, Monte-Carlo, Monaco, pg 181-187, 3 refs, 6 figs, 2 tables.

AUTHORS' ABSTRACT

A series of experiments were carried out to detect production of neutrons from a commercial (Milton Roy) palladium-nickel electrolytic cell operated with 0.1 M LiOH or LiOD as the electrolyte at a current density of ≈ 80 mA/cm². Neutron emission was monitored using a bank of 16 BF₃ detectors embedded in a cylindrical moderator assembly. A dead-time filtering technique was employed to detect the presence of neutron "bursts," if any, and characterize the multiplicity distribution of such neutron bursts. It was found that with an operating Pd-D₂O cell located in the center of the neutron detection set-up, the daily average neutron count rate increased by about 9% throughout a one month period, over the background value of ≈ 2386 counts/day indicating an average daily neutron production of ≈ 2220 neutrons/day by the cell. In addition analysis of the dead-time filtered counts data indicated that about 6.5% of these neutrons were emitted in the form of bursts of 20 to 100 neutrons each. On an average there were an additional 6 burst events per day during electrolysis with LiOD over the daily average background burst rate of 1.7 bursts/day. The frequency of occurrence of burst events as well as their multiplicity was significantly higher with D₂O + LiOD in the cell when compared with background runs as also light water "control" runs.

ITALY - THERMAL ENERGY CONVERSION

Maurizio Vignati (ISPESL, Roma, Italy), "Transformation from Heat of Low Temperature Sources into Work Fundamentals for a Maximum of Efficiency," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 631-634, 10 refs, 2 figs.

AUTHOR'S ABSTRACT

The problem of converting the heat produced by cold fusion into work, meets with a classical limit consisting in the second

principle of thermodynamics, because the heat produced within electrolytic cells is released to the heavy water, and remains at a low thermal degree. However, this paper draws attention to the existence of ideal thermodynamic cycles the efficiency of which is considerably higher than the efficiency attained by the corresponding Carnot cycle between the same temperatures. In addition to this, it can be shown that combinations of these cycles can attain even higher efficiencies. Owing to the characteristics of these cycles and combinations of cycles, and being also possible to put them into practice, they could be taken into consideration for projects aiming at the transformation into work of the heat produced by cold fusion or other heat sources at low temperature.

ITALY - ION TRAP MECHANISM

V. Violante (ENEA Dip. Energia, Settore Fusione, Centro Ricerche Frascati, Rome, Italy), A. De Ninno (ENEA, Dip. Innovazione, Settore Fisica Applicata, C.R. Frascati, Rome, Italy), "Collision Between Two Deuterons in Condensed Matter: Ion Trap Mechanism," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 355-359, 6 refs, 4 figs.

AUTHORS' ABSTRACT

In this paper is studied the behavior of ions confined by means of quadrupolar electro-dynamic containment around palladium lattice tetrahedral sites. Ion confinement in a quadrupolar trap is known to be strongly influenced by the initial conditions and trap parameters. The considered system is a lattice ion trap for deuterons, supposing that over a certain concentration they occupy the tetrahedral sites. The electron motions seem to have a dominant role in the dynamics of two deuterons moving around such lattice sites. A mathematical model allows us to describe, with a computer simulation, the deuteron dynamics and reveals an approach mechanism that could strongly decrease the mean distance between two positive charges embedded in a lattice.

JAPAN - COLD FUSION MECHANISM

Yoshiaki Arata (Arata Hall, Osaka Univ.) and Yue-Chang Zhang (Welding Research Inst., Osaka Univ., Japan), "Excess Heat and Mechanism in Cold Fusion Reaction," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 483-494, 9 refs, 7 figs.

AUTHORS' ABSTRACT

The authors have proposed a new "Model" which can reasonably explain the existence of Cold Fusion Reaction and

also verify the generation of tremendous excess energy in the DS-cathode which is fifty thousand times higher than chemical reaction energy. The new model is named "Latticequake Model." Cold fusion is caused by high energetic deuterium similar to "hot" fusion.

JAPAN - NEW HYDROGEN ENERGY REVIEW

Naoto Asami, Kazuaki Matsui (R&D Cntr. for New Hydrogen Energy, The Inst. of Appl. Energy, Sapporo, Japan) and Fumihiko Hasegawa (New Energy and Industrial Tech. Development Organization, Tokyo, Japan), "Present Status and the Perspective of New Hydrogen Energy Project," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 87-96, 6 figs.

AUTHORS' ABSTRACT

A research and development project, named as 'New Hydrogen Energy', has started in Japan in November, 1993, to confirm the excess heat generation during electrolysis with Pd-LiOD system as the first priority objective. The Project has been supported by the Ministry of International Trade and Industry (MITI) and major industries in Japan, and a new laboratory was established in Sapporo.

Present status and the perspectives of the project will be reported together with main technical results. Two types of electrolysis cells, namely, open type cell system from IMRA-Europe, Inc. and the fuel cell type cell systems from IMRA-Japan, Inc., were installed in NHE Sapporo laboratory and the experiments have started from February 1994 to demonstrate the NHE-phenomena.

Correlations among maximum attainable D/Pd ratio, deuterium absorption and desorption and the characteristics of various palladium sources and treatments have been studied and analyzed based on the results of the material observations and instrumentational analysis such as O/M, SEM, XRD, AES, SIMS and EPMA.

The laboratory will be reinforced by introducing of mass flow calorimetry systems, and reaction products detection systems towards an interim review scheduled in late 1995.

This R&D program has been conducted under the consignment of New Energy and Industrial Technology Development Organization (NEDO).

JAPAN - MEASUREMENT OF HEAT & NEUTRONS

Y. Asaoka, T. Ichiji, T. Fujita and T. Matsumura (CRIEPI, Central Research Inst. of Electric Power Industry, Tokyo, Japan), "Simultaneous Measurement Device of Heat and Neutron of Heavy Water Electrolysis with Palladium Cathode," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 120-123, 4 refs, 5 figs, 1 table.

AUTHORS' ABSTRACT

An experimental device of cold fusion phenomena has been developed. Feature of the device is precise calorimetry and simultaneous measurement of excess heat, neutron and gamma-ray emitted from the electrolysis cell. The deuterium loading ratio of the palladium cathode can be measured simultaneously.

The galvanostatic electrolysis of heavy water with Pd cathode and Pt anode has been carried out in a closed cell with recombination catalyst. For precise excess heat measurement, the flow calorimetry method were adopted. Obtained accuracy of the calorimetry system was $\pm 0.2W$ at up to 10W of applied power. The electrolysis cell was set in shielding and neutron emission was detected by an NE-213 liquid scintillation counter and a He-3 proportional detector. Gamma-ray emission was measured with the Ge(Li) semiconductor detector. Electric resistance of the palladium cathode and pressure of the gas phase in the electrolytic cell were measured simultaneously to evaluate the deuterium loading ratio. D/Pd ratio evaluated by each method has reached approximately 0.87.

With these *in-situ* measurements of heat, neutron and gamma-ray, no remarkable cold fusion phenomena have been observed up to the present time.

JAPAN - SONOFUSION

Kenji Fukushima (Phys. Dept., Joetsu Univ. of Ed., Japan), "Sonofusion: Compressibility of Liquid and Stability of Spherical Cavity," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 523-530, 8 refs, 4 figs.

AUTHOR'S ABSTRACT

We proposed the sonofusion at ICCF3 and theoretically predicted by use of a simplified model that the temperature of gas within a supersonic cavity reaches more than $10^8 K$ if the initial radius of the cavity is less than $10\mu m$, that is, temperatures high enough for the occurrence of hot fusion.

In the present paper we consider a more realistic model by taking into account the compressibility of liquid and search for the optimum values of supersonic parameters for getting high gas-temperature. In addition the stability of a spherical cavity is examined.

JAPAN - HIGH RATIO ABSORPTION

Norifumi Hasegawa, Masao Sumi, Masanori Takahashi, Toshio Senjuh, Naoto Asami, (R&D Cntr. for New Hydrogen Energy, Inst. of Appl. Energy, Hokkaido, Japan), Takeshi Sakai and Toshinori Shigemitsu (Nuclear Fuel Ind., Ltd., Osaka, Japan), "Electrolytic Deuterium Absorption by Pd Cathode and a Consideration for High D/Pd Ratio," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, Pg 449-456, 1 ref, 14 figs, 1 table.

AUTHORS' ABSTRACT

Using several kinds of Pd electrodes, electrolysis were performed in 'Fuel-Cell Type Closed Cell.' Initial deuterium absorption (D/Pd) at the first period of electrolysis of 50 mA/cm² current density. Maximum D/Pd during electrolysis and deuterium desorption were measured. Single crystal Pd electrode reached the highest initial deuterium absorption, D/Pd = 0.89, and the highest Maximum D/Pd, 0.89, during electrolysis. Except single crystal one of high purity, more than 99.99%, Pd electrodes annealed at 850° C reached the highest D/Pd, 0.87. And this electrodes showed excess heat of 13% of input power.

The results of metallographical examinations of Pd electrodes after electrolysis suggest that the electrodes of high purity, annealed at 850° C, and machined & etched to remove surface defects will be preferable to reach higher D/Pd.

JAPAN - COLD FUSION NUCLEAR PRODUCTS

Shigeru Isagawa, Yukio Kanda and Takenori Suzuki (Natl. Lab. for High Energy Phys., Japan), "Heat Production and Trial to Detect Nuclear Products from Palladium-Deuterium Electrolysis Cells," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 124-131, 7 refs, 7 figs, 3 tables.

AUTHORS' ABSTRACT

A burst-like excess heat release, equivalent to 110% of the input electric power, was clearly observed for the first time in our newly built open type electrolysis cell using Pd/0.1 MLiOD/Pt. After being precharged, the cell was driven to

boiling three times the last of which continued for about 16 hours to almost dryness. The burst occurred just during the calm period about 6 hours after the first boiling. The temperature of the cell, about 100 ml in volume, increased by 7.5 K in 13 minutes. A palladium cathode, 2mm ϕ x 7.05 mm, was a heat source, although the mechanism of the heat generation is still uncertain. During the whole period of this run, however, the phenomenon took place only once. Neither increase of neutron emission nor that of tritium concentration has been detected. Mass analysis showed that any traces of D₂ as well as ⁴He have not remained in the Pd sample used. Detection of γ ray emission as well as ³He and ⁴He in off gas during or just after release of excess power should be pursued further.

JAPAN - VACUUM-PALLADIUM EXPERIMENT

Takehiko Itoh, Yasuhiro Iwamura, Nobuaki Gotoh and Ichiro Toyoda, (Advanced Tech. Res. Center, Mitsubishi Heavy Industries, Ltd., Yokohama, Japan), "Observation of Nuclear Products under Vacuum Condition from Deuterated Palladium with High Loading Ratio," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 189-196, 3 refs, 8 figs.

AUTHORS' ABSTRACT

Gas release experiments with a method of heating highly deuterated palladium metals (D/Pd = 0.7 ~ 0.83) in a vacuum chamber to induce anomalous nuclear effects have been performed. Neutron emission and X-ray emission were observed in some cases, and DT gas breeding with high reproducibility. DT gas breeding was correlative with D/Pd and degassing rate of deuterium gas. It shows that anomalous nuclear effects are related to D/Pd and diffusion process of deuterium atoms in palladium metals.

JAPAN - X-RAY & NUCLEAR EMISSIONS

Yasuhiro Iwamura, Nobuaki Gotoh, Takehiko Itoh and Ichiro Toyoda (Advanced Tech. Res. Center, Mitsubishi Heavy Industries, Ltd., Yokohama, Japan), "Characteristic X-ray and Neutron Emissions from Electrochemically Deuterated Palladium," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 197-200, 2 refs, 5 figs.

AUTHORS' ABSTRACT

Characteristic x-ray and neutron emissions have been observed during electrochemical loading of deuterium into palladium metal. It shows that anomalous phenomena occur in

deuterium-palladium system as shown in our previous paper and the others on cold fusion.

JAPAN - DEUTERON IMPLANTED AI FOILS

K. Kamada (National Inst. for Fusion Science, Nagoya, Japan), H. Kinoshita and H. Takahashi (Dept. of Engineering, Hokkaido University), "Anomalous Heat Evolution of Deuteron Implanted Al on Electron Bombardment," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte Carlo, Monaco, pg 41-48, 5 refs, 3 figs, 1 table.

AUTHORS' ABSTRACT

Anomalous heat evolution was observed in deuteron implanted Al foils on 175 keV electron bombardment. Local regions with linear dimension of several 100 nm showed simultaneous transformation from single crystalline to polycrystalline structure instantaneously on the electron bombardment, indicating the temperature rise up to more than melting point of Al from room temperature. The amount of energy evolved was more than 180 MeV for each transformed region. The transformation was never observed in proton implanted Al foils. The heat evolution was presumed to be due to a nuclear reaction in D₂ molecular collections.

JAPAN - *IN-SITU* ERD ANALYSIS

Akira Kitamura, Takakazu Saitoh and Hiroshi Itoh (Dept. of Nuclear Engineering, Kobe Univ. of Mercantile Marine, Japan), "*In-situ* ERD Analysis of Hydrogen Isotopes During Deuterium Implantation of P/d," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 579-583, 4 refs, 3 figs.

AUTHORS' ABSTRACT

The elastic recoil detection (ERD) analysis is successfully applied to *in-situ* measurements of hydrogen isotope distributions formed in Pd during deuterium ion implantation aiming at observation of peculiar phenomena in connection with the so-called cold fusion. The beam-target D(d,p)t reaction yield during the implantation is found dependent on the beam current or the deuterium flux. This is interpreted in terms of a temperature dependence of the deuterium concentration that is measured *in situ* with the ERD method. When both surfaces of the Pd sample are coated with 7.5- μ m thick films of aluminum oxide, the reaction yield is observed to increase by a factor of about 5, and the ERD spectra show distributions of D more localized near the surface.

JAPAN - TRAPPED NEUTRON CATALYZED MODEL

Hideo Kozima and Seiji Watanabe (Dept. of Phys., Fac. of Science, Shizuoka Univ., Japan), "Nuclear Processes in Trapped Neutron Catalyzed Model for Cold Fusion," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 347-354, 26 refs.

AUTHORS' ABSTRACT

Results are given of detailed calculations of 1) probability of channeling for particles generated in $n-d$ and $n-p$ fusion reactions, 2) fusion probability of a triton generated in $n-d$ fusion with a deuteron and 3) fusion probability of a deuteron accelerated by $n-d$ elastic collision with another deuteron. A lot of neutrons are generated in a successive reactions of $d-d$ fusion reactions triggered by a trapped thermal neutron enough to explain experimentally observed anomalous excess heat, neutron bursts and tritium anomaly in optimum situations. The results confirms the preliminary estimations used in the previous works.

JAPAN - SPARKING DISCHARGE IN WATER

Takaaki Matsumoto (Dept. of Nuclear Eng., Hokkaido Univ., Sapporo, Japan), "Cold Fusion Experiments Using Sparking Discharges in Water," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 583-588, 3 refs, 7 figs.

AUTHOR'S ABSTRACT

Experiments on the DC discharge associated with microsparks were performed in ordinary water. Thin metal wires of Pd, Ni, Ti, Fe, Cd, Mo, Pt and W were used as the electrodes. Numerous sparks appeared on the surface of the electrodes, in high voltage over 40 V and simultaneously extraordinary phenomena were observed, such as ball-lightning like phenomena. [Possibly related to Ken Shoulders' high density charge clusters. Ed.]

JAPAN - MATERIALS & SURFACE ASPECTS

J. Minato, T. Nakata, S. Denzumi, Y. Yamamoto, A. Takahashi, H. Aida, Y. Tsuchida, H. Akita, and K. Kunimatsu (IMRA Japan Co. Ltd., Sapporo, Japan), "Materials/Surface Aspects of Hydrogen/Deuterium Loading into Pd Cathode," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 383-406, 23 refs, 29 figs, 2 tables.

AUTHORS' ABSTRACT

Electrolytic hydrogen and deuterium loading into Pd and Pd-Rh alloys have been investigated applying various modes of surface modification: thiourea on Pd and Pd-Rh, Pd black on Pd and Pd-Rh and Pd-Rh deposit on Pd. From these systematic data role of the bulk and surface properties of the cathode in determining the maximum loading has been discussed. The cathode loading is improved for Pd and Pd-Rh with a surface modified by thiourea and Pd modified by Pd-Rh deposit, while reduction of the cathode loading was observed when the surface of the Pd-Rh alloy cathode was modified by Pd-black. These results show clearly importance of controlling the surface catalytic property of the cathode in controlling and improving the maximum cathode loading. It has been found that $D/Pd \geq 0.95$ can be reproducible in electrolyte solutions containing thiourea at high concentrations. However, electrolysis in solutions containing thiourea can be conducted successfully only when the anode and cathode are separated by an ion exchange membrane in order to avoid the consumption of thiourea by anodic oxidation at the anode.

Application of partial deload/reload cycles to a Pd cathode in 1M-LiOD has led to improvement of cathode loading to the value between 0.9 and 0.95, but implication of such effects is not well understood yet in terms of the bulk and the surface properties of the cathode.

JAPAN - ALKALI METALLIC ION SOLUTIONS

Reiko Notoya (Catalysis Res. Cntr., Hokkaido Univ., Sapporo, Japan), "Nuclear Products of Cold Fusion Caused by Electrolysis in Alkali Metallic Ion Solutions," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 531-538, 11 refs, 3 figs.

AUTHOR'S ABSTRACT

It was confirmed experimentally that some nuclei products of cold fusion were generated during electrolysis by use of cathodes of porous nickel and platinized platinum, in light (usual) water solutions of all alkali metallic ions investigated. The author reported in the previous work that 4ppm of calcium was detected in the electrolyte of potassium carbonate light water solution by flame photospectroscopy. The gamma-ray measurement revealed the formation of ^{24}Na during electrolysis in sodium carbonate solution. ICP-mass spectra of an electrolyte of cesium sulfate solution showed several peaks of the various nuclear products in the region from 132 to 140 amu. In all electrolytes investigated, the distinct increments of tritium were measured by liquid scintillation spectroanalyzer. Simultaneously, the excess heat was measured in the thermally open cell during electrolysis in these solutions of light or

heavy water, which amounted to $\geq 200\%$ for the input power in potassium and cesium ions' solutions. From these results we can conclude that alkali-intermetallic compounds formed as the intermediate of hydrogen evolution reaction cause many types of cold fusion with neutron, proton, deuteron, triton and α -particle.

JAPAN - CORRELATE HEAT & NEUTRONS

H. Ogawa, S. Yoshida, Y. Yoshinaga, M. Aida, and M. Okamoto (Research Lab. for Nucl. Reactors, Tokyo Inst. of Tech., Tokyo, Japan), "Correlation of Excess Heat and Neutron Emission in Pd-Li-D Electrolysis," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 116-119, 4 refs, 6 figs.

AUTHORS' ABSTRACT

To investigate the dominant factors for the reproducible occurrence of the nuclear reaction in D-Pd systems, the initial electric resistance and the hardness of the Pd cathode have been examined in terms of the excess heat generation and the excess neutron emission in the LiOD-Pd electrolysis cells. The two background runs and one foreground run with the Pd cathode of high electric resistance and high hardness gave no nuclear effects, while one foreground run with low electric resistance and low hardness gave appreciable excess neutron emission and the excess heat generation. The reversal correlation was found between the two nuclear effects.

JAPAN - HIGHER LOADING RATIOS

Hikaru Okamoto, Toshiyuki Sano, Yosuke Oyabe, Toshihisa Terazawa, and Tamio Ohi (IMRA Material R&D CO., Ltd., Japan) "Approach to Obtain Higher Deuterium Loading Ratios of Palladium Cathodes," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April, 1995, Monte-Carlo, Monaco, pg 410-429, 5 refs, 8 figs, 3 tables.

AUTHORS' ABSTRACT

Deuterium loading ratios in the electrolytic palladium cathodes are measured by the electric resistance method. Many kinds of palladium rod are prepared and their loading ratios are determined during our standard electrolysis procedure. Some palladium cathodes are provided with additional treatments to change surface conditions. As results, it is found that the deuterium loading ratio is very sensitive to palladium surface conditions. For example, when a palladium sample of which surface is modified by aqua regia, the loading ratio as high as $D/Pd \approx 0.95$ is obtained at 200 mA/cm² of electrolytic currents,

which can hardly be achieved with an ordinary palladium cathode rod.

JAPAN - EFFECT OF BORON

Ken-ichiro Ota, Kazuhiko Yamaki, Shinji Tanabe, Hideaki Yoshitake and Nobuyuki Kamiya (Dept. of Energy Eng., Yokohama Natl. Univ., Yokohama, Japan), "Effect of Boron for the Heat Production at the Heavy Water Electrolysis using Palladium Cathode," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 132-135, 4 refs, 4 figs, 1 table.

AUTHORS' ABSTRACT

The heat balance during the electrolysis of 1M LiOD heavy water solution using Pd cathode has been measured using the flow calorimeter with the constant power supply and the thermochemically closed cell. The special attention was paid on the concentration of B in the palladium cathode. The B concentration was controlled from 127 to 1000ppm.

Using Pd that contained 127ppm and 1000ppm B, the excess heat was not observed. While, using Pd that contained 267ppm and 500ppm B, the small excess heat was observed at 3 runs out of 5 runs. The excess heat appeared continuously from the beginning of the electrolysis. These concentration of B might be effective for the excess heat generation.

JAPAN - STUDIES WITH ICARUS-1

Toshiya Saito, Masao Sumi, Naoto Asami, (New Hydrogen Energy Lab., The Inst. of Applied Energy, Sapporo, Japan) and Hideo Ikegami (National Inst. for Fusion Science, Nagoya, Japan), "Studies on Fleischmann-Pons Calorimetry with ICARUS 1," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 105-115, 1 ref, 4 figs.

AUTHORS' ABSTRACT

The Fleischmann-Pons calorimetry (FPC) is examined with the ICARUS 1 system, which is identical to the original cells which they designed for their calorimetry. In the present experimental studies, a critical evaluation is made of their original method (FPC) and a modified version of FPC is proposed. Its usefulness and validity is experimentally examined by detecting and regenerating artificial heat pulses regarded as heat excess.

JAPAN - DEUTERIUM RELEASE PROCESS

K. Shikano, H. Shinjima, and H. Kanbe (NTT Basic Res. Lab., Nippon Telegraph and Telephone Corp., Kanagawa, Japan), "D₂ Release Process from Deuterated Palladium in a Vacuum," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 251-254, 1 ref, 6 figs.

AUTHORS' ABSTRACT

To enhance reproducibility of the phenomena taking place in deuterated palladium, we studied in detail the change in surface temperature, electrical resistance, and D₂ pressure during the release of D₂ from deuterated palladium in a vacuum. As a result, we categorized the temperature changes into three different types that were independent of coating materials. In almost all experiments, the resistance decreased and the D₂ pressure initially increased briefly and then gradually decreased in the D₂ release process. We also tried to simulate the temperature changes by calculating the balance between Joule heat and heat dispersion.

JAPAN - LOW-ENERGY ION BOMBARDMENT

Hiroyuki Shinjima, Takashi Nishioka, Koji Shikano, and Hiroshi Kanbe (NTT Basic Res. Lab., Kanagawa, Japan), "Studies of d-d Reactions in Deuterated Palladium by Using Low-energy Deuterium Ion Bombardment," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 255-258, 5 refs, 6 figs.

AUTHORS' ABSTRACT

The cross sections and branching ratios of d+d reactions were measured as a function of deuteron energy by using low-energy deuterium ion bombardment. The branching ratio of d(d,³He)n to d(d,p)t were found to be one-to-one at energies from 2.5 keV to 20 keV in the CM frame. The reaction rate of d(d,p)t at 2.5 keV was four orders of magnitude less than that at 20 keV. These energy dependencies were good agreement with those extrapolated from measurements of the d+d reaction which was derived by the high-energy (mega-electron-volts) deuterium ion bombardments.

JAPAN - HEATED CHARCOAL CATHODE

Ryoji Takahashi (Univ. of Tokyo, Japan), "Synthesis of Substance and Generation of Heat Charcoal Cathode in Electrolysis of H₂O and D₂O Using Various Alkalihydroxides," Proceedings of the Fifth International

Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 619-622, 1 ref, 2 figs.

AUTHOR'S ABSTRACT

Charcoal was used for the cathode with interest in the fabricated micro-channels which may produce the microdrops responsible for the synthesis of material and C.F. in the electrolysis as reported in the previous proceeding.

The synthesis of material was detected with the change in color of the electrolyte, from colorless to dark brown. The excess heat was not detected for H₂O. However, for a mixture of 25% H₂O and 75% D₂O with 0.25N LiOH, the excess heat reached as high as about 30% of the input power.

JAPAN - EXPERIMENTAL CORRELATION

A. Takahashi, T. Inokuchi, Y. Chimi, T. Ikegawa, N. Kaji, Y. Nitta, K. Kobayashi and M. Taniguchi (Osaka Univ., Japan), "Experimental Correlation Between Excess Heat and Nuclear Products," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 69-78, 8 refs, 6 figs, 2 tables.

AUTHORS' ABSTRACT

A comparator of twin system was developed to study possible correlation between observed excess heat phenomenon and nuclear products. Simultaneous on-line measurements were done foreground (Pd cathode) and background (Ni cathode) cells to monitor input/output powers, neutron spectra and X-ray spectra. Slight (5-7%) excess powers were observed with 99% level, only for Pd-cathode-cell, with weak neutron emission in the energy over 3 MeV. Burst events by X-ray detectors were analyzed.

NETHERLANDS - DECREASED RADIOACTIVITY

Otto Reifenschweiler (Philips Res. Lab., Eindhoven, The Netherlands), "Some Experiments on the Decrease of the Radioactivity of Tritium Sorbed by Titanium," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 163-172, 5 refs, 5 figs.

AUTHOR'S ABSTRACT

A sharp decrease of the radioactivity of tritium was observed when the hydrogen isotope is sorbed by small monocrystalline particles of titanium and the preparation is heated to several hundred degrees centigrade. In other experiments the concentration of tritium in such preparations was varied,

showing that the radioactivity of the tritium increased less than proportionally to its concentration. A first attempt is presented to explain these remarkable effects in terms of a "nuclear pair hypothesis."

RUSSIA - HEAT WITH GLOW DISCHARGE

A.B. Karabut, Ya.R. Kucherov, I.B. Savvatimova (Scientific Industrial Assoc., "Luch," Moscow Region, Russian Federation), "Excess Heat Measurements in Glow Discharge Using Flow 'Calorimeter-2'," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 223-226, 4 refs, 6 figs.

AUTHORS' ABSTRACT

Experimental facts and results of heat and electric power measurements (including nuclear products) are presented.

RUSSIA - GLOW DISCHARGE EXPERIMENTS

A.B. Karabut, S.A. Kolomeychenko, I.B. Savvatimova (Scientific Industrial Assoc., "Luch," Moscow Region, Russian Federation), "High Energy Phenomena in Glow Discharge Experiments," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 241-250, 7 refs, 10 figs, 1 table.

AUTHORS' ABSTRACT

The experimental results of the nuclear product registration are presented in this paper. In our previous experiments with glow discharges in deuterium, excessive heat release, neutron, gamma and charged particle emission have been observed. New data on emission of radiation (neutrons, gamma and x-rays, heavy charged particles, fast electrons) and on electric processes near the cathode provide clearer understanding of the specific nuclear processes involved into the reported observations. A possible mechanism for the initiation of these reactions is suggested.

RUSSIA - COLD FUSION IN KD_2PO_4 CRYSTALS

V.A. Kuznetsov, A.G. Lipson, E.I. Saunin, T.S. Ivanova (Inst. of Phys. Chem. of the Russian Academy of Sciences, Moscow, Russia), "Heat Effects and Cold Fusion in KD_2PO_4 Crystals on the Ferroelectric Phase Transition," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 547-562, 13 refs, 4 figs, 1 table.

AUTHORS' ABSTRACT

The kinetic peculiar features of the phase transition (ΔH) have been investigated by the differential scanning calorimetry method in KH_2PO_4 and KD_2PO_4 crystal on transition through the Curie point at preset rates cooling and heating samples. It has been shown that on reaching a large number of thermal cycles the ΔH values of a KD_2PO_4 crystal are undergo inversion, so that the value of ΔH_{EXO} begins to exceed that of ΔH_{ENDO} . Such an anomaly of the ΔH behavior is absent in the hydrogen-containing analogue of KD_2PO_4 , a KH_2PO_4 crystal, for which $\Delta H_{EXO} > \Delta H_{ENDO}$ for any number of thermal cycles. A phenomenological model of an anomalous thermal effect in KD_2PO_4 crystals on a ferroelectric phase transition has been suggested, the transition being effected under explicitly nonequilibrium conditions. Using that model as a basis, the contribution of the domain walls elastic energy to the total transition heat has been calculated, the contribution being due to exoenergetic nuclear reactions taking place in the KD_2PO_4 crystal lattice on the splitting up of deuterons interacting with giant fluctuations of the domain walls elastic energy density

RUSSIA - POSSIBLE OBSERVATION

A.G. Lipson, I.I. Bardyshev, D.M. Sakov (Inst. of Physical Chem., Russian Academy of Sciences, Russia), "Possible Observation of the First Excited State of He^4 Nucleus According to the γ Emission Data in KD_2PO_4 Crystals upon Transition Through Curie Point," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 563-570, 11 refs, 3 figs, 1 table.

AUTHORS' ABSTRACT

The spectrum of γ -radiation (in the range of 3.0 - 8.5 MeV), generated by KD_2PO_4 crystals on the phase transition through Curie point, was studied by the use of a semiconductor, low-background detector. The maximum γ -radiation with the energy of 4.1 ± 0.8 MeV and the width $\Gamma = 0.6 \pm 0.4$ was detected. The maximum has been recorded in the course of the ferroelectric phase transition on KD_2PO_4 single crystals, and proves the decay of the first excited state of He^4 nucleus.

RUSSIA - NEUTRON FLUX & COSMIC BACKGROUND

A.G. Lipson and D.M. Sakov (Inst. of Physical Chem. of the Russian Academy of Sciences, Russia), "Amplification of the Neutron Flux Transmitted Through KD_2PO_4 Single Crystal at the Ferroelectric Phase Transition State," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 571-578, 11 refs, 4 figs.

AUTHORS' ABSTRACT

The phenomenon of external neutron flux amplification (about 10% from total value) emitted from Cf^{252} neutron source ($I = 8 \cdot 10^2$ n/s in 4π), then partially moderated by use of polyethylene (Co) and transmitted through the KD_2PO_4 (DKDP) single crystal being at the ferroelectric phase transition state has been obtained. If DKDP crystal was out of the phase transition temperature interval upon the transmission of neutron flux through it, then amplification effect was not observed. The variation of excess neutron emission intensity ejected by DKDP crystal at the different detector's background level has been studied. The intensity of neutron emission (after subtraction of the background) is increased from 0.01 count/s at cosmic background level (0.01 count/s) to 0.20 count/s background level of detector (with Cf^{252}). The dependence of count's rate of neutron events on the efficiency in DKDP crystal-detector system has been investigated, too. It was determined the correlation between the value of external neutron flux transmitted through the DKDP crystal and intensity of excess neutron emission from this crystal. The non-isotropic distribution of excess neutron emission from DKDP crystals has been established. The data obtained for DKDP crystals irradiated by external neutron flux upon the ferroelectric phase transition could be the confirmation for next hypothesis: "cold fusion" neutron emission is induced by external irradiation of cold fusion objects by the cosmic background neutrons.

RUSSIA - EFFECTS IN DEUTERON CONDUCTORS

A.L. Samgin, S.A. Tsvetkov, V.S. Andreev, V.A. Khokhlov, E.S. Filatov, I.V. Murygin, V.P. Gorelov, S.V. Vakarin (Inst. of High-Temp. Electrochem., Russian Academy of Sciences, Ekaterinburg, Russia), O. Finodeyev (ENECO, Salt Lake City, Utah), "Cold Fusion and Anomalous Effects in Deuteron Conductors During Non-stationary High-temperature Electrolysis," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 201-208, 4 refs, 4 figs, 4 tables.

AUTHORS' ABSTRACT

The studies were conducted with the perovskite-type solid electrolytes based on the strontium and barium cerates under hydrogen and deuterium atmosphere. Anomalous effects were found manifesting themselves in the overbackground neutron bursts, excess heat release, phase composition and crystal lattice parameter changes. At 200-750° C the regions of the temperature were identified which accompanied by significant heat evolution that was greater in the deuteron conductors than in the proton conductors.

RUSSIA - UNITARY QUANTUM THEORY

Lev G. Sapogin (Dept. of Phys., Technical Univ., [MADI], Moscow, Russia), "On One of Energy Generation Mechanism in Unitary Quantum Theory," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 361-366, 16 refs.

NO ABSTRACT

RUSSIA - OBSERVATIONS OF CATHODE

Irina Savvatimova, Alexander Karabut (Scientific Industrial Assoc., "Luch," Moscow Region, Russian Federation), "Nuclear Reaction Products Registration on Cathode after Glow Discharge," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 213-222, 4 refs, 5 figs, 2 tables.

AUTHORS' ABSTRACT

We watched the changing of some impurity elements on the Pd cathode (99.9% purity) after proton, proton-deuteron and deuteron ion's irradiation under the equal glow discharge conditions.

RUSSIA - RADIOACTIVITY IN CATHODE

I.B. Savvatimova, A.B. Karabut, (Scientific Industrial Assoc. "Lutch," Moscow Region, St. Russian Federation), "Radioactivity of the Cathode Samples after Glow Discharge," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 209-212, 3 refs, 3 figs.

NO ABSTRACT

RUSSIA - SODIUM TUNGSTEN BRONZE CRYSTALS

S.V. Vakarin, A.L. Samgin, V.S. Andreev and S.A. Tsvetkov (Inst. of High-Temp. Electrochem., Russian Academy of Sciences, Ekaterinburg, Russia), "Influence of Perfection of Sodium Tungsten Bronze Single Crystals on Neutron Emission," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 227-232, 2 refs, 8 refs.

AUTHORS' ABSTRACT

Correlation between crystal structure perfection and neutron emission has been found. Positive result on neutron generation

has been established only for crystals with "specific" X-ray diffraction pattern. This allows to treat X-ray data as a selection criterion. The crystals have proven to be rather perfect. Damage of perfection of the surface layer results in absence of the effect.

SPAIN - MEASURING ABSORPTION RATE

M. Alguero, J.F. Fernandez, F. Cuevas and C. Sanchez (Dpto. Fisica de Materiales, C-IV. Facultad de Ciencias. Univ. Autonoma, Madrid, Spain), "An Experimental Method to Measure the Rate of H(D)-Absorption by a Pd Cathode During the Electrolysis of an Aqueous Solution: Advantages and Disadvantages," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 441-448, 9 refs, 5 figs, 1 table.

AUTHORS' ABSTRACT

An experimental set up to measure the rate of H(D) uptake by a Pd cathode during the electrolysis of an aqueous electrolyte has been built and its behavior is analyzed. The experimental procedure is based on the pressure changes that take place within a closed electrolytic cell during the hydride (deuteride) formation. Calibration of the system has been done by accomplishing electrolysis with two Pt electrodes and the error sources have been studied. A protocol to be used in Pd hydrogenation (deuteration) is defined. Finally, the advantages and disadvantages of this experimental method against measurements of the Pd electric resistance variations are briefly discussed.

SPAIN - IODIDE TITANIUM FILMS

F. Cuevas, J.F. Fernandez, M. Alguero and C. Sanchez (Dpto. Fisica de Materiales C-IV. Fac. de Ciencias. Univ. Autonoma de Madrid, Spain), "An Experimental System for "Cold Fusion" Experiments with Self-produced Iodide Titanium Films," Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 457-460, 6 refs, 1 fig.

AUTHORS' ABSTRACT

An experimental system has been developed to grow pure titanium films on tungsten substrates. The physicochemical properties of these films have been widely studied and ad hoc samples can be used for Cold Fusion experiments avoiding their contact with atmosphere. Different Cold Fusion experiments are proposed in a new experimental setup that allows deuterium gas loading of the film while electrical

current is applied through them. Thus, an experimental configuration similar to an electrochemical loading is attained.

YUGOSLAVIA - MAGNETIC INTERACTIONS

R.D. Antanasijevic, Dj. Konjevic, Z. Maric, D.M. Sevic, J.P. Vigier, A.J. Zaric (Inst. of Phys., Belgrade, Yugoslavia), "'Cold Fusion' in Terms of New Quantum Chemistry: The Role of Magnetic Interactions in Dense Physica Media (Neutron and X-ray detection in plasma focus and "capillary fusion" experiments), Proceedings of the Fifth International Conference on Cold Fusion, 9-13 April 1995, Monte-Carlo, Monaco, pg 505-522, 18 refs, 9 figs.

AUTHORS' ABSTRACT

Various recently reported "break even" in different types of "cold fusion" experiments have a common physical origin if one assumes that one should add, in dense states, the action of magnetic interactions of oriented nuclear spins to the usual Coulomb forces. In that case, one is led to predict a) the existence of new "tight" quantum molecular states (associated to new "tight" Bohr orbits) which correspond to the emission of X-ray lines and excess energy, and b) the associated apparition [appearance] of a certain amount of nuclear fusion reaction due to those magnetic interactions and enhanced tunneling by strong electron concentrations. They appear in the form of neutron (or γ) bursts and various types of "ashes" of particular nuclear fusion reactions in electrolysis, glow discharge, capillary devices, resonance sonoluminescence and plasma discharge experiments. They both contribute to observable energy excess in amounts which vary with chosen set-ups.

To explore this assumption two experiments are presented here i.e. 1) discharge experiments in plasma focus and "capillary fusion" devices (i.e. nuclear fusion) of 10^8 neutron/burst, 2) X-ray measurements in deuterium plasma focus confirm the existence of new Bohr orbits.

New possible experiments to check it are also briefly discussed.

E. MEETINGS

ICCF6

Sixth International Conference on Cold Fusion
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The conference will consist of both oral and poster sessions covering experimental work and theory on the following topics:

- Excess Energy Phenomena in D₂/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.

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.

Submission of papers

The full manuscript (max. four pages) and three copies are to be received by Feb. 1, 1996, for review by the International Program Committee. Full manuscripts must be in the format specified. (Contact IASTED at (403) 288-1195 or Fax (403) 247-6851, e-mail iasted@istd.cuug.ab.ca for specific paper instructions.) Include a statement in your cover letter confirming that if the paper is accepted, one of the authors will attend the conference to present it and pay the registration fee of \$400 by 1 April 1996. Notification of acceptance will be mailed by March 1, 1996.

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

1st International Symposium on
 CONSCIOUSNESS, NEW MEDICINE, AND NEW ENERGY
 Tokyo, Japan -- November 21-22, 1996

Sponsored by the Japan Psychotronics Institute
 2-2-2, Sekigawa-cho, Arai-shi, Hiigata 944, Japan
 Telephone: 0255-72-0558

Some of the presentations include:

"Paradigm of New Science / New Scientific Worldview" by
 Shiuji Inomata, President of Japan Psychotronics Inst.

"Subtle Energy and New Medicine" by Beverly Rubik,
 President, Intern'l. Inst. of Frontier Science

"Cold Fusion" by Drs. Stanely Pons and Martin Fleischmann

"Research and Development of the N-machine" by P. Tewari,
 Nuclear Power Corp., India

"Theory, Experiment and Design of Superconducting Magnet N-
 machine" by Shiuji Inomata

"Clean Energy Research in Natural Group Co., Ltd." by Osamu
 Ide, Director, Natural Group Co., Ltd.

Commercial Column

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*. 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.

JET Energy Technology, Inc.: Design and manufacture of π -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 617/237/2625. Fax 617/237/3625.

Magnetic Power Inc.: Introducing the Takahashi Battery Doubler™ in the U.S., which improves the charge release (1.5 to 2.5 times normal battery operation). Sebastapol, 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

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.

Institute for New Energy, organization to promote and help find funding for new energy research. Home Page: www.padrak.com/ine/ contains many important scientific papers and current reports on all areas of research. E-mail: ine@padrak.com Voice 801/583/6232, Fax 801/583/6232.

New Energy News monthly newsletter for INE, edited by Hal Fox, Salt Lake City, UT 801/583-6232

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>

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

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

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.

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

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

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

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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JOURNAL OF NEW ENERGY

From the Institute for New Energy comes a new quarterly journal for new energy research. Professional papers on cold fusion and other enhanced energy systems are solicited from scientists, engineers, inventors, and students. Papers will be peer-reviewed.

The Journal of New Energy (JNE) is devoted to publishing professional papers with experimental results that may not conform to the currently-accepted scientific models. The topics to be covered in this journal include cold nuclear fusion, low-energy nuclear reactions, high-density charge cluster technology (including some plasma circuits where enhanced energy is produced), high-efficiency motors or generators, solidstate circuits that appear to provide anomalous amounts of output energy, and other new energy devices. Papers with experimental data are preferred over theoretical papers. Standard alternative energy topics such as hydrogen fuel, wind power, solar power, tidal power, and geothermal power are not solicited.

Subscriptions to the Journal will be \$150 per year, or \$45 per issue. The first issue is currently available from the Fusion Information Center, address this page.