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NATIONAL PHILOSOPHY ALLIANCE CONFERENCE

By Hal Fox

The NPA (National Philosophy Alliance) held its annual meeting in conjunction with the annual meeting of the South Western and Rocky Mountain (SWARM) Division of the American Association for the Advancement of Science at Mesa State College in Grand Junction, Colorado, May 17 to 21, 1998.

The several sessions of the NPA conference included the following: Coping with Suppression of Innovative Thought; Special Relativity for the Open-Minded; Relativity-Related Topics; Particle Theory and Quantum Mechanics; Quantum Physics; Into Practice: New Physics, New Energy; and Astronomy and Cosmology.

Dr. John E. Chappell, Jr. presented several papers and was the leading person in the NPA to set up the conference, handle the many papers submitted, and communicate with all NPA members. For his excellent managerial work and scientific work, Dr. Chappell deserves great credit.

The NPA is considered a "dissident group" because one of their objectives is to shine the light of truth onto the blind acceptance of the Special Theory of Relativity (STR). The scientific literature constructively criticizing some of the results of Einstein's Special Theory of Relativity is voluminous. However, in the United States, such criticism is generally ignored by the bulk of the scientific community. Scientists in other countries, especially in France and Russia, wonder why the scientists of other countries are so slow to make the needed changes to the STR.

Several excellent papers on STR problems were presented at the conference. Two that were impressive to this editor, were the following: Neil E. Munch, "Inadequate Controls of Assumptions in Special Relativity"; and Professor Domina Eberle Spencer & Uma Shama's "Visualizing the Postulates

on the Velocity of Light". This last paper examined the mathematical solutions of Einstein's second postulate (on the speed of light in vacuum) with two other later postulates. Only the latest version of this important STR postulate transfers into equations that are fully consistent with the latest experimental data from the array of orbiting Global Positioning Satellites. The measured time for the electro-magnetic radiation to travel from earth to the array of satellites and return to earth is different if you send the signals through these satellites in one direction around the world as contrasted with transmission in the opposite direction. Einstein's STR fails to explain the discrepancy. The latest version of the second postulate, as presented by Spencer and Shama, fully explains the experimental evidence.

So, why editorialize on the speed of light in an energy newsletter? The answer is that the resistance of the majority of the scientific community to accept new scientific experiments, models, and theories slows down scientific progress; denies employment to highly-qualified scientists (for failure to abide by accepted dogma); denies funds for dissident research; and denies publication of new discoveries in some prestigious journals. **This list of denials is precisely those things that have delayed the development of several discoveries in the new-energy area (such as cold fusion).** Therefore, any organization that can help to overcome the scientific prejudice to new technology is worthy of support and can help the new-energy community.

Here is one approach that was presented at the conference: **PUT YOUR MOUTH (MIND) WHERE THE MONEY IS (OR WILL BE)!** The concept is that new technology, **as it is proven**, will be able to provide money for those who are willing to devote their minds, talents, and innovation to further the

development of the new technology. By using the brain power that exists in this one organization, the development and commercialization of new technology can be accelerated. A group of scientists who can both understand and **correct the inadequacies of Einstein's work** can provide a much-needed insight into new-energy technology. **In return, the monies that flow from such new technologies can support the hiring, the experiments, the publications, and the patent applications that will come from such intellectual effort.**

We know that some members of the NPA have directed their efforts into helping new technology grow and prosper. We have reason to believe that several more members of the NPA will become involved in solving some of the difficult scientific problems involved in transmutation, tapping space energy, and developing new-energy sources.

For further information about the NPA, write to NPA or John E. Chappell, Jr., PO Box 14014, San Luis Obispo, CA 93406. Membership is \$30 per year.

Professor Yull Brown

Prof. Yull Brown passed away Friday, May 22, 1998, at the Westmead Hospital in Auburn, Australia. He died with his loved ones and closest friends by his bedside.

Yull Brown was the inventor of the production and use of Brown's Gas, a special high-efficiency method for the electrolysis of water and the use of the resulting mixture of hydrogen, deuterium, and oxygen. Properly used, Brown claimed that Brown's Gas could reduce radioactivity in some materials.

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Fusion Briefings

ABSTRACTS FROM ICCF-7

April 1998 – Vancouver, BC, Canada

Program Manual and Abstracts

Part Two (cont'd from May 1998 *NEN*)

Proceedings will be available in July from:
 ENECO, 391-B, Chipeta Way,
 Salt Lake City, UT 84108.

Stephen M. Hrushovez (Winnipeg, Canada), **"Integer-Linked Elementary Particle Charges and the Theoretical Pole of Neutrino Oscillation in Nucleon-Loaded Metal Anomalies,"** p 68.

Particle physics has established that matter can be reduced to twelve elementary fermions (six quarks and six leptons that are also classified in three families with four distinct electric charge magnitudes) and at least twelve gauge bosons in interactions: the photon in electromagnetism, $W^+ W^-$ and Z^0 in weak interactions, and eight gluons in the strong nuclear force between quarks. Other elementary particles with some preliminary support are the graviton in gravitation, the Higgs boson and the leptoquark. This paper presents an integer approach to the mass (and other) charges of these particles that fits their recognized mass ranges (some of which are known to nine significant digits), predicts masses of unconfirmed particles, links gravity and electric forces, and suggests a neutrino-related explanation for anomalous X-ray, nuclear and thermal effects in metals like palladium or nickel loaded with H^+ or D^+ .

In this integer approach to elementary particle charges a set of six distinct prime numbers are used for elementary fermion masses in each of the three families, where some are arithmetically combined with the group's neutrino mass. Another set of six and primes 2 and 3 are used in deriving masses of gauge bosons, and a similar approach is used for electric and gluon charges. Based on this integer approach, the predicted maximum mass particle is linked with electric charges such that the strengths of gravitational and electrical forces balance, suggesting a more specific determination of the Newtonian gravitational constant, G_N .

Of particular relevance to anomalous phenomena in metals loaded with nucleons by electrochemical or other means ("cold fusion") are my predicted neutrino and quark masses along with other facts and hypotheses: 1) scientists estimate that there are tens of millions of neutrinos passing through one square centimeter of space per second; 2) theorists predict neutrinos with mass allow them to oscillate

between types; 3) my predicted energy difference between a muon neutrino of about 88.2 keV and a much lighter electron neutrino resembles the 89 ± 1 keV "energy of radiation" of X-rays observed in heat-producing D* loaded Pd cells but not in a Pt cell as reported at ICCF-6 by Cignini, Gozzi et al.; 4) the same energy difference is included in a quark rest energy; and 5) in quantum cavity electrodynamics spontaneous decays of excited atoms can be enhanced by absorbing "walls" tuned to the frequency of emitted photons. Thus, it is proposed that muon neutrinos naturally passing through "cold fusion" systems have their change into electron neutrinos enhanced by D⁺ or H⁺ nuclei within the metals when certain quarks separated by appropriate distances (the 88.2 keV wavelength of about 0.266 the Bohr radius) act as energy-absorbing "walls of a cavity", and then release thermal or electromagnetic energy (e.g. X-rays) and/or cause other ionizing and nuclear effects, perhaps including fusion or transmutation. Similar decays of tau neutrinos with a predicted mass 11 times more than the muon neutrino could yield more energetic (and more hazardous) gamma-rays, and explain the preference for Li⁺ in experiments. Also proposed (but not performed) are clear experimental tests and useful applications of this neutrino-related model of anomalies in nucleon-loaded metals.

Y. Isobe, H. Fukuoka, A. Takahashi (Dept. Nucl. Engr., Osaka Univ., Japan), "**Simultaneous Measurements of Neutrons, X-Rays, Excess Heat and Loading Ratio Using Opened D₂O Electrolysis System,**" p 69, 2 refs.

In our experiments using an open type electrolysis system, measurements of excess heat, neutrons, X-rays and loading ratio have been carried out simultaneously to know the correlation between the degree of loading ratio and occurring of cold fusion phenomena and to discover the correlation between excess heat and nuclear products if such phenomena were observed. A new experimental system was tested in this work.

The electrolyte was 0.04M LiOD heavy water and several rod-shaped metals (2 mm ϕ x 75mm long) were used as cathodes. Excess heat measurement were performed by using a mass flow calorimetry method. Input power was calculated from the input current and the cell voltage. The output power would be calculated by measuring the temperature of cooling water and the flow rate which kept at the entrance and the exit point of the cell. Then we could estimate excess heat production in the cell by comparing the output power with the input power, considering the heat recovery efficiency. Temperature was measured with a resistance temperature device (RTD) and a digital multi-thermometer. The degree of loading ratio is obtained by measuring the electrical resistance of the Pd cathode during electrolysis and comparing with the known calibration data (SRI International McKubre, et al.). The measured values were managed by PCS immediately and automatically. Two NE213 neutron detectors were setup in front of the cell. Neutron signals were separated from γ -ray signals by the two dimensional analysis of rise-time

and pulse-height. As we used two detectors, the system was very reliable for the detection of anomalous neutron emission. For example if one detector observed the increase of signals and the other one detected the similar phenomena simultaneously, the signals should be true ones. X-rays were detected by two CdTe X-ray detectors. The purpose was the detection of characteristic X-rays (21 ~ 23keV) that would be generated in the slowing down process of emitted charged-particles with several MeV kinetic energy in the Pd cathode. In the experiments, the step-up current mode (several tens watts maximum) was used for electrolysis.

This experimental system have been just completed. Now we are doing a series of experiments and accumulating the data to obtain some results.

Yasuhiro Iwamura, Takahiko Itoh, Nobuaki Gotoh, Mitsuru Sakano, Ichiro Toyoda (Advanced Technol. Res. Ctr., Mitsubishi Heavy Ind. Ltd., Yokohama, Japan), "**Detection of Anomalous Elements, X-Ray and Excess Heat Induced by Continuous Diffusion of Deuterium Through Multi-Layer Cathode (Pd/CaO/Pd),**" p 70, 2 figs.

We investigate "cold fusion" phenomena with a new type of experimental apparatus for the purpose of causing nuclear reactions by continuous diffusion of deuterium through Pd. It consists of an electrochemical cell and a vacuum chamber. There exists continuous flow of deuterium atoms from the electrolyte side to the vacuum side through a Pd plate.

Continuous X-ray ranging from 10 keV to 100 keV, neutron and excess heat productions were observed using the apparatus. Several elements such as Ti, Si, Cu or Fe were detected on the surface where deuterium atoms passed through Pd cathodes by EPMA. XPS, AES and ICP-MS were applied for the analysis of Ti. Quantitative discussion taking account of the analysis of D₂O solutions, Pd cathodes and platinum anodes shows that the detected Ti atoms cannot be explained by contamination.

Multi-layer cathode was developed based on EINR (Electron Induced Nuclear Reaction) model which the authors introduced for explaining experimental results. We observed excess heat generations and X-ray emissions for all the cases we tried (6 cases) by using the multi-layer cathodes. It was demonstrated by the experimental results that CaO was one of the elements which can induce nuclear reactions and it was necessary that CaO exists at the near surface of Pd. Different elements such as Zn or Pb, in addition to Ti, Si, Cu or Fe were also detected on the surfaces of the multi-layer cathodes. We are now trying to clarify the origins of these elements. At present, we consider that the detected Fe atoms may not be explained only by contamination, as SIMS analysis of Fe showed isotope shift.

Xing-liu Jiang (Dept. Appl. Phys., Beijing Univ. Aeron. & Astron., China), "**Electrochemical Noise, Pitting Corrosion, and Cold Fusion**," p 71, 3 refs.

Experimental data show that pitting corrosions are tightly associated with electrochemical noise in a electrolysis cell. Transient energy concentration in a tiny area leads to local ablation, oxidization of electrode metal, and even nuclear reaction. Most of excess heat events during heavy or light water electrolysis without nuclear products could be explained by the formation of metal oxides. As E. Storms pointed out, a critical current is required to initiate the effect of excess heat. Once initiated, excess heat production increases in a linear fashion as the current increased. From this fact, increasing of the amount of the metal oxides can be observed correspondently. Nuclear reactions occur if a critical value of energy density reaches in the sites of cathode surface, typically on the protrusions.

A model of electrical network with elements of capacitance and resistance has been proposed by the author for describing the evolution of electrochemical double layers and the generation of electrochemical noise. High energy density has been stored in the electrochemical double layers due to high conductivity of electrolyte with high concentration of solutes. The structure of electrochemical double layer collapses under condition of local field enhancement caused by tip effect or roughness of electrode surface. The energy concentration occurs in collapse point by instantaneous release of the energy stored in the capacitance of double layer network. Strong electrochemical noise with pitting corrosion has been detected at this case. The variety of observed nuclear reactions involving high-Z elements suggests the presence of a very efficient effect for overcoming the coulomb barrier by vortex, which is created by self-magnetic micro pinch of local field electron emission with high current density.

From the factors mentioned above, the excess heat can be produced by the chemical processes, such as the oxidization and hydrogenization of electrode metals under the ablation condition with no nuclear radiation, or by the nuclear processes with nuclear products. The evolution of electrochemical double layer should be intensively studied for further understanding of the so-called "cold fusion".

Xing-liu Jiang, Li-jun Han (Dept. Phys., Beijing Univ. Aeronautics & Astronautics, China), "**Tip-Effect and Nuclear-Active Site**," p 72, 2 refs.

High concentration of anomalous elements, Zn. Cu. Fe, Si, Mg etc. has been detected on the protrusions of palladium cathode with many cutting slits on the edge for electrolysis with heavy water. The electrolysis cell has been operated for 350 hrs. The anomalous element distribution has been confirmed by EDX and synchrotron radiation technique. To determine the spatial distribution and the life-time of the activation of nuclear transmutation, the film of 135 black-white, 27 Din has been used to image the positions of the nuclear-active site(NAS). After 1.5 years of finishing electrolysis experiment, the pattern of the NAS has been clearly formed on the films for exposing 100 hrs. As the

description by tip-effect theory proposed by Xing-liu Jiang, the fusion reactions occur only on minute areas of the electrode surface owing to the tip effect.

It is well known that a very high electric field exists at the tip of the protrusions of electrodes. Energy concentration leads to the formation of benefit to create the conditions of melting of electrode metals and nuclear fusion.

For making the evolution of the electrochemical double layer during the process of energy concentration to be understood easily, a model of lightning-cloud-land was proposed to reveal the complicated behaviors and the transient processes from the electrochemistry to the nuclear reaction. From the point of view of the electric circuit theory, a mini-network with the parameters of R, L, C can be used to give a vivid description of such the processes.

X.L. Jiang, L.J. Han (Dept. Applied Phys., Beijing Univ. Aeronautics and Astronautics, China), "**Anomalous Element Production Induced by Carbon Arcing Under Water**," p 73, 2 refs.

There exist various phenomena for electric discharge in water, such as radiation with wide bands, collective ion acceleration, electron degeneracy and Fermi linear atoms etc. which occur in dense state of matter in stars. The arcing has been created in the gap between two purified carbon rods in de-ionized water. The carbon rods contained a few parts per million (ppm) iron, and carbon detritus produced by carbon arcing contained up to thousands ppm of iron determined by an atomic emission spectroscopy. It is deduced that the plasma filaments with superdense matter due to micro pinch effect make nuclear transmutation possible. Elements of Cr, Co, Zn etc. have been also found in the carbon detritus. The excess of iron isotope Fe-58 comparing with natural iron was determined by neutron activation analysis.

Table. Elemental anomalies at the surface of Palladium cathode after electrolysis

Location	A	B	C	D	E
Elements Atomic %					
Na	0.2	1.95	1.82	0.28	
Mg	1.79	3.47			
Al	1.33	1.45	16.15		
Si	3.34	1.18			
Fe	11.66	1.68	9.86		1.72
Cu	8.20	2.35	9.91		
Pt	3.07	9.99	4.82		3.97
Pd	52.83	72.84	38.01	97.45	94.31
Zn	17.50	5.09	19.44		

X.L. Jiang, C-Y- Chen, L.J. Han (Dept. Applied Phys., Beijing Univ. Aeronautics and Astronautics, China), "**Anomalies of Elemental Distribution at the Surface of Palladium Cathode**," p 74, 2 refs.

Palladium rectangled cathodes used to electrolyze heavy water show a protrusion and near --surface enrichment of elements Ga, Se, Rb, Zn, Cu, Fe, Si, Mg etc. The palladium cathodes after electrolysis were analyzed by Scanning Electron Microscope, Energy Dispersion X-ray Spectrometer and Synchrotron Radiation Detection etc. **In view of the fact that the energy concentration is associated with protrusions and cracks on the palladium cathode**, the tip--effect model and related nonlinear processes are considered to account for the anomalies of the experimental phenomena. It suggests that nuclear reactions are assisted by the high electron density on the protrusions locally and temporally due to tip--effect. As control experiments, light water was used for electrolysis under same conditions. Few of elemental anomalies on the palladium cathode with light water has been detected.

K. Kamada, Y. Enokido (Energy Res. Ctr., Wakasa Bay, Japan), Yoshio Katano (Japan Atomic Energy Res. Inst., Japan), Isao Yoshizawa (Fac. Ed., Ibaraki Univ., Japan), **"Anomalous Heat Generation of Deuteron-Implanted Aluminum upon Electron Bombardment II,"** p 75.

In a previous paper presented in ICCF-5 held in Monaco, one of the authors (K.K) has reported an anomalous heat generation in deuteron implanted Al upon high energy electron bombardment. In the present paper, the further investigation of the phenomenon will be reported.'

Several possible mechanisms of the observed surface melting, such as the heating effects of the electron beam, size effect of the melting point of metals, difference of the depth profiles between implanted proton and deuteron, and also the possible chemical reactions due to the electron bombardment in deuterium collections, were investigated. Nuclear reactions between deuterons were also investigated whether or not the resultant nuclear products are capable of the surface melting.

The necessary energy deposition for a typical melted region is about 160 MeV. This is nearly 10^5 times that of the energy loss of the impinging 175 KeV electron beam through the Al foil. From numerical calculation of the energy deposition upon the surface layer due to the kinetic motion of the deuteron or deuterium in the collection, we obtained that mean kinetic energy of roughly 100 eV for each deuteron or deuterium molecule is enough to produce the observed surface melting. This amount of energy is, however, too large for any kind of chemical reactions, but on the contrary, too small, presumably to attribute the phenomenon to the result of nuclear reactions.

These results will be supplemented with further theoretical and experimental investigations.

A. Karabut (SIA "Luch", Podolsk, Moscow region, Russian Fed.). **"Excess Heat Registration (up to 200 W) in D₂ and H₂ High Current Density Glow**

Discharge with Various Cathode Materials," p 76, 1 ref.

The registration of input electrical power and output heat power in experiments with a high current Glow Discharge was carried out with using a device-flowing calorimeter. The input electrical power was defined by integration of product of operating meanings of a current and voltage. The output heat power was defined by summation of heat powers of the cooling cathode, an anode and a chamber calorimeter. The system of Date Acquisition was used on the base of DAS-1400 and CTM-05 boards, and IBM PC computer. The initial processing of electrical parameters was made using analog precise boards with the time resolution more 1 MHz. The absolute calibration of heat registration system was carried out using resistive heaters, which gave precise values of power. A special resistive heater, which was set up instead of the Glow Discharge device, was used for control tests of the thermal balance registration system. The total error of measurements of Excess Heat (according to the tests) does not exceed 3%.

The special pulsing periodic power supply, the special cathode sample design and way of its installation (using the concepts of the phonon laser theory) were used in experiments. This technology of the experiment has allowed to receive Excess Heat with reproducibility of 100% and to make comparative experiments for various systems: a material of the cathode, sample plasma forming gas (D₂, H₂).

The maximum value of Excess Heat (up to 3 IW at EFFICIENCY 150 %) is received for Pd-D system. The high value of Excess Heat are registered for the following systems: (Ti-D, 17W); (Ta-H, 15W); (Ta-D, 12W); (Nb-H, 12W); (V-D, 11 W); (V-H, 12W). The low value of Excess Heat (3-5W) are observed for systems Pd-H, Zr-H, Ti-H, Nb-D. Excess Heat is very small (1-1,5W) for Zr-D. The long registration of Excess Heat (during 150 hours) for one Pd sample in D₂ was carried out in a mode of cycles (23 switch off and switch on). These tests have shown 100 % reproducibility of Excess Heat production at the level of 10 W with a deviation of (± 3 W (EFFICIENCY - 130 % (± 5 %)). The value of Excess Heat decreased monotonously by 20% to the end of the experiment.

Demonstrating Glow Discharge device of multi element was created using the results of these researches. Four cathodes - anodes pairs are placed in a vacuum chamber with volume of 350 Cm³ and had a feed from the transistor power supply. This Glow Discharge device has shown Excess Heat more 200W at EFFICIENCY of about 150%.

A. Karabut (SIA "Luch", Podolsk, Moscow region, Russian Fed.), **"Registration of Impurity Elements Production with Changed Isotopes a Natural Ratio in Current Density Glow Discharge,"** p 77, 2 refs.

In the assumption that registered excess heat is connected to proceeding nuclear reactions the analysis of the impurity contents in the cathode samples material before and after experiments with using Glow Discharge device flowing

calorimeter was made. The methods were used: secondary ion mass - spectrometry (SIMS), secondary neutral mass spectrometry (SNMS). The method for the impurity determination included the following operations: removal of the top layer (probably a polluted layer with the thickness of 15 angstrom using the plasma etching method; taking off and analyzing of the first layer with the thickness of 50 angstrom (scan 1); taking off and analyzing of the second layer with the thickness of 50 angstrom (scan 2); plasma etching of the cathode samples (removal of the material layer with the thickness of 1000 angstrom); taking off and analysis of the third layer with the thickness of 50 angstrom (scan 3), taking off and analysis of the fourth with the thickness layer of 50 angstrom (scan 4). This technique was used for the analysis of the cathode sample before and after the experiment. The difference of impurity quantity before and after the experiment was determined as production of elements in the experiment. These researches have shown that production the impurity nuclides occurs in the volume of the cathode sample in a superficial layer up to 0, 1 microns. The greatest production of the impurity nuclides in Pd matrix and change of their natural a isotope ratio is registered for the cathode sample as "phonon resonator" (is submitted Dr. Kucherov, ENECO). The impurity of elements with mass less than Pd mass approximately twice and with mass close to Pd mass are registered in number up to a few tens of percents. In this sample change of a natural ratio of isotopes in the top layer of Pd is observed. The change of a natural ratio of isotopes in a few tens of times is received for some impurity elements (Ca, Ti, Fe, Ni, Ge and other). The absence of some basic (with large % by the contents in a nature) isotopes of impurity elements was registered. There is the absence of the following isotopes of ^{58}Ni , ^{70}Ge , ^{73}Ge , ^{74}Ge , ^{113}Cd , ^{116}Cd . The production of impurities rare earth nuclides ^{146}Nd , ^{152}Sm , ^{153}Eu , ^{163}Dy and ^{185}Re was registered after the experiment for Ta cathode sample. These results have high reproducibility. Scheme of nuclear reactions realization can be used at the analysis of these experimental results. Estimating the value of nuclear reaction of 3-10 MeV, the value of heat energy registered in the experiment per one cathode sample will be corresponded with the quantity of received impurities of stable nuclides.

A. Karabut (SIA "Luch", Podolsk, Moscow region, Russia), **"Research of Penetrating Radiation in Current Density Glow Discharge,"** p 78, 1 ref.

The research of penetrating radiation in experiments with a high current density Glow Discharge was made using various types of detectors and an x-ray film. The special pulsing periodic power supply, the special design of the cathode sample and way of its installation (using the concepts of the phonon laser theory) were used in experiments. This technology of the experiment has allowed to receive generation of penetrating radiation at the level of $10^5 - 10^7$ 1/sec with of the reproducibility 100%. The results of use of a neutron ^3He detector with the multichannel analyzer of spectrum and a monitor have shown that the signals in experiments like are on a neutron signal, but they are not neutrons. The intensity of radiation changes up to 10^4 times at change of cathode sample

material and plasma forming gas. The penetrating ability (energy of radiation) has correlated dependence on energy of nuclear levels of the cathode sample material. The multiplication of radiation by a factor of 2 -2,5 is observed at the installation of the lead screen with thickness 50 mm between the cathode and the detector. Presumably the effects of biological influence of penetrating radiation on a human were observed in this run of experiments.

The results of penetrating radiation registration using of other types of detectors and an x-ray film can be interpreted as follows. We register ultra short ($10^{-11} - 10^{-13}$ sec) monoenergy beams fast electrons with energy up to several MeV and accompanying microwave radiation. Probe measurement allow to estimate number ($10^9 - 10^{13}$) of electrons in a beam.

The weak radiation of this type (up to $10 - 10^2$ 1/sec) is observed after switch off discharge during time from several minutes up to several hours. It is possible to assume the existence of metastable excitation levels with the energy higher than several keV in solid with large life time.

These results show that the channels of nonlinear transformation of low energy of $10^2 - 10^3$ eV of plasma ions in to high energy of $10^4 - 10^6$ eV of electrons are realized to the solid cathode sample. This fundamental physical phenomenon is observed for all metals and plasma forming gases..

The received experimental results are according to the theoretical ideas of professor P. Hagelstein.

J. Kasagi, H. Yuki, T. Itoh, N. Kasajima, T. Ohtsuki (Lab. Nucl. Sci., Tohoku Univ., Japan), A.G. Lipson (Inst. Physical Chem., The Russian Academy of Sciences, Moscow), **"Anomalous Enhanced D(d,p)T Reaction in PdO Observed at Very Low Bombarding Energies,"** p 79, 3 refs.

We have started a series of measurements of the D(d,p)T reaction in metal with the bombarding energies down to 2 keV, in order to investigate whether the reaction rate in metal is really enhanced or not. Previous results on Ti and Yb, clearly show that the reaction rate is enhanced in metal and depends on the kind of host metal. However, the enhancements obtained for both metals are so small that no nuclear reactions can be observed at a room temperature.

Recently, we studied the D(d,p)T reaction in Pd and PdO. Foils of PdO/Pd/Au (50 μm in thickness) and of Pd (200 μm in thickness) were used as targets. For the PdO/Pd/Au foil, electrolysis was carried out as reported in A.G. Lipson, et al., Proc. ICCF-6 pp 433, prior to the bombardment in order to charge deuterium. The targets were cooled at about -160°C during the bombardments. For the PdO/Pd/Au bombardment, deuterons stop in the PdO layer of about 50 nm in thickness. Protons emitted in the D(d,p)T reaction were measured with a ΔE -E counter telescope consisting of Si surface barrier detectors. The yield at $E_d = 10$ keV

were measured frequently during the run, and the yield of each energy was normalized to the yield at 10 keV.

In Fig. 1, we show thick target yields of the D(d,p)T reaction in PdO (O), Pd (□) and Ti (◇) against bombarding energy. The yields for PdO are surprisingly larger than those for Pd and Ti. The dotted curve shows a thick target yield calculated with the bare reaction cross section, which corresponds to the reaction without enhancement. For PdO, the calculation completely fails to reproduce the data; about 50 times smaller than the datum at 2.5 keV! To interpret the enhanced reaction, a screening potential (U_e) which reduces the Coulomb barrier between two deuterons is naively introduced. A dashed curve which reproduces the PdO data very well is a calculation with $U_e = 600$ eV. This is very significant, since a simple extrapolation of the reaction rate allows us the cold fusion. Thus, it is highly desirable to investigate the origin of the anomalously enhanced reaction rate observed in this work.

Y.E. Kim (Dept. Phys., Purdue Univ., West Lafayette, IN), "Bose-Einstein Condensation Mechanism for Anomalous Ultra-Low Energy Nuclear Reaction in a Condensed Matter," p 80, 12 refs.

There have been persistent claims of observing ^4He production with no accompanying γ -radiation from heavy water experiments. Since the radiation-less fusion reaction, $\text{D} + \text{D} \rightarrow ^4\text{He}$ is forbidden in free space, many theoretical explanations have been proposed based on condensed matter mechanisms. In this paper, we propose an alternative mechanism based on possibility of Bose-Einstein condensation of deuterons in cavities and cracks in the cathode metal.

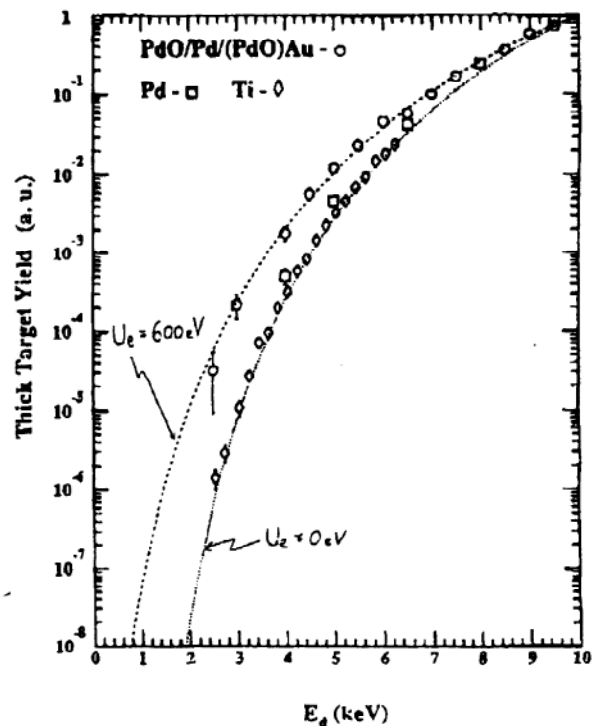
The concept of the Bose-Einstein condensation (BEC) has been known for 73 years, and has been used to describe all physical scales, including liquid ^4He , excitons in semiconductors, pions and kaons in dense nuclear matter (neutron stars, supernovae), and elementary particles. It is only a few years ago that the BEC phenomenon was observed directly in dilute vapors of alkali atoms, such as rubidium, lithium, and sodium confined in magnetic traps and cooled down to nanokelvin temperatures.

If (1) deuteron BEC occurs in cavities (μm - mm size) and cracks (μm - mm gap) in the cathode metal during the electrolysis experiment and (2) $\text{D} + \text{D} \rightarrow ^4\text{He}$ fusion occurs with two deuterons in the BEC, the BEC and ^4He in the final state can share kinetic energy and momenta due to the Q-value of the fusion reaction, thus avoiding the need for accompanying γ -ray radiation. Two essential conditions for achieving the BEC of an interacting Bose system are (i) that the density of the Bose system is low, i.e., two-boson separation distance is larger than the interaction range, and (ii) that the temperature of the Bose system is low (\sim nanokelvin). The condition (ii) can be realized if deuterons in a cluster are moving with (nearly) same velocity, i.e. relative velocities of deuterons are (nearly) zero. We will describe possible mechanisms for the formation of the deuteron BEC in cavities and cracks and also for reducing the Coulomb barrier of deuterons in the BEC.

Y.E. Kim, A.L. Zubarev (Dept. Phys., Purdue Univ., West Lafayette, IN), "Role of Continuum Electrons in Ultra-Low Energy Nuclear Reactions," p 81, 4 refs.

Leggett and Baym investigated an upper bound on barrier penetration probabilities in many-body systems and claimed to obtain the result that the rate of tunneling of nuclei to classically forbidden small relative separation in a fully interacting quantum-mechanical many-body system in equilibrium, is rigorously bounded above by a value calculable in terms of the Born-Oppenheimer potential between nuclei.

For the case of continuum electrons, there is a fraction of electron with $\lambda_e \lesssim \lambda_N$, where λ_e is the electron wave length, $\lambda_e = \hbar / \sqrt{2m_e E_e}$ and λ_N is the nucleon wavelength, $\lambda_N = \hbar / \sqrt{2M_N E_N}$. For the case of $\lambda_e \lesssim \lambda_N$, or $(E_e/E_N) \lesssim 10^{-3}$, the conventionally used adiabatic approximation is not valid, since the Coulomb continuum state for three charge particles (electron and two nuclei) remains to be correlated in the whole Hilbert space. At present, we cannot prove nor rule out theoretically that nonadiabatic effects of the continuum electrons for the



case of $\lambda_e \lesssim \lambda_N$, may explain some of anomalous effects observed in deuterated metals.

It is shown that the above nonadiabatic mechanism may lead to emission of high-energy electrons ($\text{D} + \text{D} + e \rightarrow ^4\text{He} + e$, etc.). Since there are no other known mechanisms for

emitting such characteristic high-energy electrons, this nonadiabatic mechanism can be tested experimentally by measuring the high-energy electrons.

M.J. Klopfenstein, J. Dash (Phys. Dept., Portland State Univ., OR), "**Thermal Imaging During Electrolysis of Heavy Water with a Ti Cathode,**" p 82

Two closed cells in series, one with a titanium cathode and one control, and both with $D_2O - H_2SO_4$ electrolyte, were electrolyzed. A thermal imaging device (Agema 900 series) was used to determine the temperature distribution from top to bottom of each cell. A video tape shows the thermal images as a function of time, as well as the temperatures at the top and bottom of each cell.

The average temperature of the experimental and control cells was nearly the same for the first 50 minutes of the experiment. After this, the temperature in the upper part of the control cell, where the recombination catalyst was (located, increased rapidly compared with the experimental cell.

The titanium cathode was characterized by SEM and EDS before and after electrolysis. Changes in surface topography and micro composition were determined. Changes in isotopic abundance were determined by high resolution (Fison, 0.1 amu) ICPMS. The ratio of Ti isotope of mass 50 to each of the other stable isotopes was 5 to 10% less after electrolysis compared with the same titanium sample before electrolysis.

Hisatoki Komaki (Inst. Biological Agriculture, Otsu, Japan), Teruo Hanawa, Yoshio Tani (Intl. Earth Environment Univ., Otsu, Japan), "**The Observations on the Non-Radioactive Biological Cold Fusion, Using Saccharomyces Cerevisiae,**" p 83.

In 1960s, Prof. C. Louis Kervran suggested the probable occurrence of the biological transmutation of elements in various organisms. In order to confirm the phenomena (non-radioactive biological cold fusion, we should say), under more controlled condition, one of us [Hisatoki Komaki] determined the amount of potassium, magnesium, iron and calcium in the cells of *Aspergillus niger*, *Penicillium chrysogenum*, *Rhizopus nigricans*, *Mucor rouxii*, *Saccharomyces cerevisiae*, *Torulopsis ulitis*, *Saccharomyces ellipsoideus* and *Hansenula anomala*, cultured in normal medium and media deficient in one of potassium, magnesium, iron or calcium, and suggested the biological formation of these elements. In order to confirm the phenomena, under more controlled condition, using ultra-violet fluorescence analyzer and PIXE (particle induced X-ray emission) analyzer, we determined the amount of the all elements in the cells of *Saccharomyces cerevisiae*, cultured in normal medium and media deficient in one of iron, manganese and magnesium. The experimental results led us to conclude the biological formation of iron and magnesium: The non-radioactive biological cold fusion.

H. Kozima (Dept. Phys., Fac. Sci., Shizuoka Univ., Japan), "**The TNCF Model for the Cold Fusion Phenomenon,**" p 84.

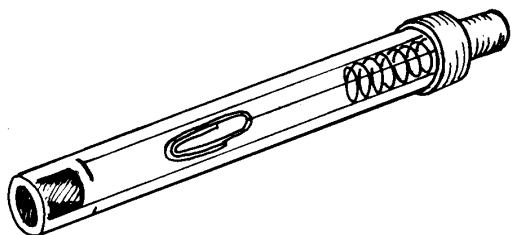
The TNCF model for the cold fusion phenomenon including various events of the excess heat, tritium, helium and neutron generations and nuclear transmutation (NT) etc. is explained with applications for more than forty typical experimental data. The cold fusion phenomenon has occurred in various materials and the explanation of the variety in the events and fields should be phenomenological at first if a unified point of view is demanded. This is the conceptual basis for a model theory of the cold fusion phenomenon.

The TNCF model uses one adjustable parameter n_n expressing a density of the trapped neutron assumed to exist in materials showing the cold fusion phenomenon. There are more several premises in the model used common for all materials and events. The number of analyzed data more than forty will substantiate reality of these premises including the existence of the trapped neutrons in the materials when and where observed the cold fusion phenomenon.

The explained experimental data include following typical data with the determined parameter n_n cm^{-3} in parentheses: the excess heat and others by Fleischmann et al. in 1989 ($10^7 \sim 10^9$), the excess heat by Storms In 1993 ($\sim 10^7$), Ota et al. in 1994 ($\sim 10^{10}$) and McKubrc et al. in 1995 ($10^9 \sim 10^{10}$); neutron by Jones et al. in 1989 ($\sim 10^{11}$) and De Ninno et al. in 1991 ($\sim 10^9$), helium 4 by Morrey et al. in 1990 ($\sim 10^8$), Miles et al. in 1993 ($10^9 \sim 10^{10}$) and Cellucci et al. in 1996 ($\sim 10^9$), tritium by Storms et al. in 1990 ($\sim 10^7$), Srinivasan et al. in 1990 ($\sim 10^8$) and Takahashi et al. in 1992 ($\sim 10^3$), and NT by Bush et al. in 1994 ($\sim 10^7$), Okamoto et al. in 1994 ($\sim 10^{10}$), Notoya et al. in 1996 (10^9) and Passell in 1996 ($\sim 10^9$) and others.

These parameters n_n determined by the experimental data of number of events for those quantities were in a range from 10^6 to $10^{12} cm^{-3}$ as shown above partly. This amount of the trapped neutron in solid is not absurd from the point of view of the solid state physics. The origin of the trapped neutrons may be attributed primarily to the background ambient neutrons abundant around us. The fundamental cause of this conjecture is null results obtained in zero background conditions. There remain some discrepancies between the TNCF model and experimental data. The most serious one is lack of simultaneity of several events in experiments expected by the model. The cause of this discrepancy should be due to either defects of the model or insufficiency of the experiments.

The bases of the premises of the TNCF model are discussed using the conventional physics; nuclear physics and solid state physics. Key points to verify the model will be behavior of thermal neutrons in crystals: especially neutron band formation and neutron wave - lattice nuclei interaction. Effect of these factors on the nuclear reactions in solids between thermal neutrons and the lattice nuclei is investigated suggesting a new science of the thermal neutrons in solids.



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Yan Kucherov (ENECO, Salt Lake City, UT), **"Nuclear Acoustic Resonance Amplification,"** p 85, 2 refs.

Nuclear acoustic resonance (NAR) is the interaction of nuclear hyperfine levels with AC electric field induced by solid state lattice oscillations (phonons). When a strong magnetic field is applied to such a system, it can reach a resonance, when magnetic field energy is lost or gained. A change in magnetic field can be detected, allowing to measure the coupling line width etc. It is known that the presence of a stable charge vacancies in TaH lattice results in the anomalous NAR effects. To get this anomaly, the lattice must have two components - light and heavy sublattices. The nucleus does not have a dipole electric moment in its ground state, but some of the nuclei have quadrupole moment, which can interact with phonons. Normally the light sublattice has higher phonon frequencies and heavier nuclei can have larger quadrupole moment,

which are the preferences for NAR. The lattice also must have stable charge vacancies.

NAR effect is one of the few realistic ways to excite a nucleus with a low energy interaction. To do that the effect must amplified. There are a lot of obstacles on this path. The most prohibitive are magnetic decoupling and a modified form of the Anderson's Localization theorem. The first problem can be dealt with by orienting nuclear spin in a DC magnetic field. The second one requires extremely strong phonon mode to allow lattice / nucleus energy transfer. The ways to create a strong phonon mode using phonon focusing effects are discussed in the present paper.

If all the conditions are met, semiclassical calculations give energy transfer rates of up to 10^5 eV per nucleus, exceeding possible decoupling mechanisms rates, except for the nuclear events. The quantum mechanics model of this effect is too complex, and so far was not successful.

X.Z. Li, S.X. Zheng, H.F. Huang, G.S. Huang, W.Z. Yue (Dept. Phys., Tsinghua Univ., Beijing China), **"New Measurement of Excess Heat in a Gas-Loading D/Pd System,"** p 86.

As reported in ICCF-6, the excess heat has been observed in a gas-loading D/Pd system in terms of the comparison between a pair of twin systems. The temperature of the D/Pd system is always higher than or equal to that of a H/Pd system while there is essentially no power input into these twin systems. It can be explained as an evidence of excess heat in the D/Pd system if the heat transfer coefficients are essentially same for these twin systems. Some questions were raised about the measurement of heat transfer coefficients. Because the heat conductivity is known to be smaller in deuterium gas, one may expect a smaller heat transfer coefficient in a dewar filled with deuterium gas. One way to solve this problem is to conduct the excess heat measurement in a single dewar filled with deuterium gas only instead of twin systems. That is what we have done after ICCF-6 in the same apparatus. There is no electrodes or electrolyte for electrolysis. The gas-loading process is completed with no high pressure and cryogenics because a tungsten filament is heated to dissociate the hydrogen molecules. The unique feature is to maintain a high loading ratio after the filament is turned off in a dewar system, which contains a long palladium wire (0.234 cm^3), and has a low heat transfer coefficient ($0.1 \text{ W/}^\circ \text{C}$).

The temperature of the D/Pd gas-loading system (T_D) is carefully monitored every 60 seconds for more than one month while the bath temperature (T_B) is monitored in parallel as well. If there is no excess heat, when the bath temperature is higher than that of the D/Pd system, the temperature of the D/Pd system increases; when the bath temperature is lower than that of D/Pd system, the temperature of the D/Pd system decreases, because the D/Pd system is immersed in this bath tank. Consequently, the temperature of the D/Pd system must equal to the temperature of the bath temperature at the points where the temperature of the D/Pd system takes its maximum or

minimum value. This behavior was observed indeed in our experiment. However, we have observed also that the temperature of the D/Pd system increases while its temperature is higher than that of the bath. This is a very strong evidence showing the excess heat in the D/Pd system, because it is based on the Second Thermodynamic Law.

The highest temperature difference of ($T_D - T_B$) was 3.8°C , and lasted more than 14 hours. It corresponds to an excess power of more than 1 W/cm^3 in palladium wire. We are currently searching for the condition (loading ratio, temperature, and cooling rate, etc.) in order to keep this excess heat behavior for a longer period. If we are able to succeed in keeping this amount of excess heat for more than one month, or we are able to increase this excess power, there will be an opportunity to show that this excess heat is from non-chemical sources.

The gas-loading system has the features of safety (no explosive gas-mixture), economy (no deuterium gas released), high Carnot efficiency (no constraint from the boiling temperature of electrolyte) as a future energy source; it also has the advantage of essentially no power input (good for excess heat measurement), and less contamination (good for nuclear transmutation test). This is why our gas-loading experiment has continued for more than 7 years. The detail of gas-loading method will be discussed in conducting this series of experiments.

X.Z. Li H.F. Haung, S.X. Zheng, G.S. Huang (Dept. Phys., Tsinghua Univ., Beijing, China), "**Selective Resonant Tunneling Model for Low-Energy Induced Nuclear Reaction in Solids, (1)-- Analysis of the Failure of the "Excess Heat" Experiments in Terms of "FineTuning" Parameter,**" p 87.

Selective resonant tunneling model has been proved to be useful in explaining the low-energy induced nuclear reaction in solids, and in guiding the experimental search for excess heat. The only assumption in this model is the existence of an energy level in the deuteron-deuteron nuclear well with a very narrow width, and this assumption is supported by the experiments of "Heat after Death" and "Heat after Life". After the ICCF-6, three major steps have been made in developing this theoretical model. These are: (1) analyzing the failure of NHE in reproducing "excess heat"; (2) including the low-energy induced nuclear transmutation in this model; (3) comparing with the spin resonant tunneling phenomenon which has been well identified as the resonance between very narrow energy levels.

The resonant tunneling model was first proposed in ICCF-5 to explain the major feature of the cold fusion phenomenon: i.e., excess heat without commensurate neutron and Gamma radiation. However, there was a question of "fine tuning". How can we tune on such a narrow resonant energy level? In ICCF-6 a "fine tuning" mechanism was proposed to answer this question. Indeed, the D/Pd system may keep itself in a resonant state if the

cooling rate is not too strong, and if the density of states in solid is decreasing with the energy.

During ICCF-7, it was claimed that the NHE-FCS could not reproduce the excess heat observed in the Fuel Cell Type Electrolysis System. However, having looked at their calorimetry in details, we have found the salient difference between the NHE-FCS and the Fuel Cell Type Electrolysis System. In the view of the "fine tuning" mechanism there is a key parameter to describe the capability of keeping itself in resonant tunneling state. That is the ratio of the volume(V) of palladium cathode to the heat transfer coefficient(k), i.e. V/k . Since same electrodes were used in NHE-FCS and in the Fuel Cell Type Electrolysis System, the volume of the palladium is supposed to be same for both system ($V \approx 0.188\text{ cm}^3$). The difference in heat transfer coefficient is evident. The $k \approx 0.75\text{ W/}^\circ\text{C}$ in the NHE-FCS, and $k = 0.1\text{ W/}^\circ\text{C}$ in the Fuel Cell Type Electrolysis System. Based on the experimental data in the past 7 years, if this "fine tuning" parameter, V/k , is greater than $0.6\text{ cm}^3 \cdot ^\circ\text{C/W}$ there would be a positive excess heat effect. Consequently, the D/Pd system in NHE-FCS might lose its capability in keeping itself in resonant tunneling state. The "fine tuning" parameter for NHE-FCS is $V/k \approx 0.25\text{ cm}^3 \cdot ^\circ\text{C/W}$, and $V/k = 1.88\text{ cm}^3 \cdot ^\circ\text{C/W}$ for the Fuel Cell Type Electrolysis System. It is understandable that there is no excess heat observed in NHE-FCS and the excess heat was observed in the Fuel Cell Type Electrolysis System. The same analysis was applied to Kunimatsu's experiment in IMRA. The "finetuning" parameter, $V/k \approx 0.18\text{ cm}^3 \cdot ^\circ\text{C/W}$ for their mass-flow calorimeter, and $V/k \approx 1.16\text{ cm}^3 \cdot ^\circ\text{C/W}$ for the isoperibolic calorimeter, respectively. Indeed the NHE and IMRA reproduced the Australian experiment (Green & Quickenden in 1994-1995), where the "fine tuning" parameter was as small as 0.0354, and the excess heat effect was proved to be within the experimental error, although they were using isoperibolic calorimeter. It suggests that greater palladium volume and less flow rate of cooling water might reproduce the excess heat even if in the NHE-FCS.

Andrei G. Lipson, Shigeru Miyashita, Ryoichi Shimada, Naoto Asami (Inst. Applied Energy, New Hydrogen Energy Lab., Sapporo, Japan), Tadahiko Mizuno, Tadashi Akimoto (Hokkaido Univ., Dept. Nucl. Engr., Sapporo, Japan), Boris F. Lyakhov (Inst. Physical Chem., The Russian Acad. Sci., Moscow, Russia), "**Nuclear Emissions in Au/Pd/PdO:D(x) System Induced by Exothermic Deuterium Desorption,**" p 88.

It was shown earlier in experiments being carried out in Russia (Inst. Physical Chem. of RAS, Lebedev Phys. Inst. of RAS) that exothermic deuterium desorption from Au/Pd/PdO:D (D: PdO/Pd/PdO:D) - heterostructure is accompanied by emissions of neutrons, gammas & charged particles (protons and alphas). The emissions were observed in air conditions in the process of D-desorption stimulation after electrochemical loading of a thin heterostructure sample (0.002 - 0.06 cm thickness) in 1M - NaOD solution in a heavy water. The samples used were produced in IPC RAS from vacuum annealed Pd foils,

oxidized in an oxygen flame (PdO thickness within 20 - 50 nm) and had on one side electrodeposited layer of Au.

To test nuclear results in such a kind of system the experimental set up has been designed based on high vacuum NHE - facility. Nuclear measurements have been conducted using simultaneously 2 SSB detectors, 2 Cd Te - X - ray detectors, gamma HPGe & NaI detectors. The neutron measurements were carried out in air atmosphere with the help of detector consisting of 2 independent big NE - 213 counters with total efficiency of about 8%. The initiation of D - desorption from the sample has been provided by both heating and self- deformation (strain) in the vacuum chamber as well as in air atmosphere.

The neutron charged particles and X - ray spectra from the Au/Pd/PdO samples loaded with deuterium have been obtained and studied. The charged particles spectra consist of two peaks: the first with position ~ 1.5 MeV and second, broad within 4 - 6 MeV. The peak between 1 - 2 MeV is attributed to protons from dd - reaction with taking into account an energy losses during their escape from heterostructure. The broad peak in a high energy interval (4 - 6 MeV) possibly is a signature of a multibody dd - reaction. The process of charged particles emission in vacuum in some cases was accompanied by X - ray emission, possibly Au - K alpha line.

In the neutron spectra the peaks located near the 2.5 (for both independent detectors) and between 4 - 5 MeV interval are obtained.

Andrey G. Lipson, Elliot B. Kennel, Shigeru Miyashita, Ryoichi Shimada, Naoto Asami (Inst. Applied Energy, New Hydrogen Energy Lab., Sapporo, Japan), Ivan I. Bardyshev, Vladislav A. Kuznetsov (Inst. Physical Chem., The Russian Acad. Sci., Moscow, Russia), **"Change in Thermal Neutron Cross-Section for Pd and Cu Cathodes During the Electrolysis under Irradiation by a Weak Thermal Neutron Flux,"** p 89.

The spectrum of gamma - emission generated during electrolysis of Copper - cathode in the light water electrolyte has been studied. 2 sorts of Cu have been used: 1) nominally pure Cu - foil (cold-rolled) with purity 99.9 % and 0.2 mm thickness; 2) hard commercial copper (cold - worked) doped with 0.14% Si, 0.3 mm thickness. The 1 - M solution of KOH in light water was used as an electrolyte. Anode was Pt - plate. The gamma - spectra detection has been carried out with pure Ge - detector, having energy resolution of about 2.0 keV. To create neutron flux the Cf- 252 neutron source with intensity of about 2×10^3 n/s in 4 pi solid angle has been used. For thermalization of neutrons inside electrolytic cell all set up with detector was surrounded by of about one metric ton of moderator (polyethylene and water).

The experiments showed that during electrolysis of Cu (1) under thermal neutron irradiation there were no excess gamma - emission in all spectral intervals within the energy 0.1 - 5.0 MeV. For Cu samples (2) and (3) some increase

of gamma counting rate in the foreground runs was detected within the energy interval $10^{31} - 10^{47}$ keV that corresponds to Cu - 66 10^{39} keV gamma peak's position. Simultaneously, the decrease of 2.225 MeV peak due to thermal neutron capture by hydrogen has been observed.

The results of background subtracting from foreground counts are presented within the energy interval that corresponds to 1039.4 keV peak location. For foreground runs with duration (electrolysis time) less then 5000 s the positive significant effect (ΔN) = $(1.30 \pm 0.35) \cdot 10^{-3}$ c / s has been obtained with appearance of peak having position close to 1039 keV. In the same time for long foreground runs (t > 12000 s) the negative result was established. These data confirm that the peak near the 1039.4 keV position is really a signature of Cu - 66 generation (because the half - life for Cu -66 is about 5.1 min).

The effect of Cu - 66 generation (with the total mean rate $v = 1.70$ at. Cu -66/s) is connected with increase in thermal neutron' s capture cross section of copper (decrease in 2225 keV line intensity in foreground runs) during electrolysis under the thermal neutron irradiation.

The similar experiments with 100 micron thickness Pd foils in 1M - NaOD electrolyte have been carried out and showed significant increase in thermal neutron cross section for these foils during electrolysis. The result obtained will be discussed.

G. Lonchamp, J.-P. Biberian, L. Joncourt, L. Bonnetain (Commissariat a L'Energie Atomique, France), **"Excess Heat in Palladium Cathodes at Boiling,"** p 90.

At ICCF-6, we have shown results of experiments exhibiting excess heat during electrolysis of D₂O at boiling temperature. At the same conference Pons et al., have shown that continuous boiling experiments produce large amounts of excess heat at boiling for long periods of time. We have built a unique calorimeter using both, heat and flow calorimetry. We show our preliminary results on platinum and palladium.

G. Lonchamp, J.-P. Biberian, L. Joncourt, L. Bonnetain (Commissariat a L'Energie Atomique, France), **"Excess Heat and Nuclear Ashes in Nickel Palladium Beads,"** p 91.

In collaboration with CETI, we have started a research program on excess heat and transmutation on beads. Experiments have been performed in two types of electrolytic cells: the Rifex cell as such has been used for excess heat and transmutation work, and a new cell has been measured in the two types of cells without possibility of errors, and we give our nuclear transmutation results by ICP and SIMS.

Runbao Lu (Inst. Applied Phys.& Comp. Math., Beijing, China), "**Some Problems in Solar Physics and Astrophysics**," p 92.

The problem on solar flare mechanism is still open. On the basis of model of "electron-ion bound state and its introducing of nuclear fusion" it is given that there are two kinds of x-ray emission processes in solar flares: soft x-ray emission with energy ~12.5 keV x-ray (p-e-p) and hard x-ray emission with energy ~25 keV ($d^+ - e - d^+$) and γ -ray. Meanwhile there are (d,d) fusion in hard x-ray burst events.

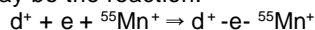
On the basis of measurements of x-ray spectrum the author points that x-ray emission from CYG x- 1 (black hole candidate), 4U0115 + 63 (neutron star), and SN 1987A (supernova) may be like it from the solar flare. In the high state of black hole it may correspond to soft x-ray flare, and in the low state it may correspond to hard x-ray flare. In the 4U0115 + 63 events, it may not be absorption lines at 12 keV and 23 keV, but the emission lines at ~12.5 keV and ~25keV. In the SNI987A, x-ray source comes from p-e-p ~12.5 keV and $d^+ - e - d^+$ ~25 keV and γ -ray. The author suspects where so many atoms of ^{56}Ni and ^{56}Co come from. I think the x-ray spectrum of SNI987A is similar to the x-ray spectrum in solar flare.

Runbao Lu (Inst. Applied Phys.& Comp. Math. Beijing, China), "**Where Does the Excess Heat Come From in the "Cold Fusion" Experiment?**" p 93.

Based on the model of "electron-ion bound state and its introducing of nuclear fusion" it is given to analysis some "cold fusion" experiments.

S. Pons and M. Fleischmann said "The most surprising results has been that the generation of high levels of excess enthalpy is not accompanied by the expected levels of tritium and neutron generation." It is not necessary to surprise because the excess heat mainly comes from the X-ray.

There are some of "cold fusion" experiments such as the experiment of H. Fukuoka et al. Y. Iwamura et al., S. Szpak et al., especially F. Cellucci's et al. experiment that gives the evidence of what excess heat comes from x-ray. J. Dufour's experiment gives the quantitative result: p-e-p ~ 12.5 keV X-ray. G.H. Miley and J.A. Patterson's experiment may not be transmutation. It is a kind of "electron-ion bound state" in the form of p-e-A⁺ or $d^+ - e - A^+$ with emission of X-ray. Equally, W.I. Vysotskii's et al. experiment may be the reaction:



Eugene F. Mallove (Cold Fusion Technology, Inc., Concord, NH), "**Hydro-Nuclear Reactions and Electro-Alchemy: Evidence and Prospects**," p 94.

The evidence for a variety of low-energy nuclear reactions and nuclear-scale energy production has been confirmed in a variety of systems. Some of these systems have already reached commercial prototype stage for both energy production and the transmutation of nuclides (radioactive and non-radioactive).

In this paper, we review the classes of experimental evidence and relate these to possible empirical models and theoretical insights that may clarify the large variety of phenomena in the "hydro-nuclear" or "electro-alchemy" field--possibly a more encompassing name than the original term, "cold fusion." Armed with these insights, it is possible to project the directions along which rapid commercialization of these new technologies will occur. These go far beyond the ability to produce the often requested warm "cup of tea."

U. Mastromatteo, SGS-Thomson (R & D Lab., Cornaredo, Italy), "**Nickel Submicron-Thick Layers Heated over Curie Temperature Show High Temperature Spots if Exposed to Hydrogen Atmosphere**," p 95.

A prototype microcell has been designed using a silicon chip of about 10 mm² size. On one side of the chip it has been realized a structure including a low electrical resistance polysilicon heater (anode), a high Hydrogen content dielectric layer and a 0.2 microns thick Nickel resistor (cathode). The total thermal resistance of the cell (under vacuum and package for electrical connections included) was so high that 70 mW were enough to overcome the Curie temperature.

Several experiments using that cell prototype with a very thin Nickel layer have pointed out that it is possible in a certain conditions of temperature and electrical biasing, the activation into the metallic lattice of Hydrogen absorption able to modify the electrical resistivity of the layer. In all the experiments where Hydrogen was present it has also detected large fusion spots in the Nickel layer due to high and fast temperature rising. This high temperature is not explained by chemical exothermic reactions or by external power input instability.

If those should be led, as calculation about specific power needed to have such fusion spots say. to *cold fusion phenomena*, then a different configuration of the cell, more suitable for heat extraction and robustness of Nickel layer should be easy to prepare for excess power measurements and quantification.

We are actually working on the design of a new cell configuration with a completely integrate calorimeter (microbolometer) able to detect any small temperature increase (even locally) through thermal emissions measurements. This control system may be in the same cell environment and electrically connected to the input power control system to guarantee maximum system stability.

Free Energy: The Race to Zero Point

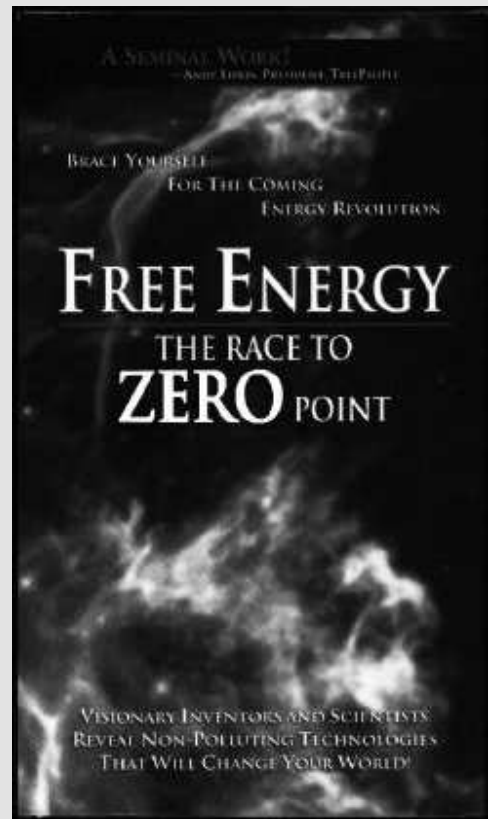
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The actual cell dimensions are in the range of a small integrate silicon chip, because the purpose of the experiments is to realize a power generation device suitable for portable electric apparatus, but it is in principle completely scalable for high power generation.

K. Matsui, N. Asami, M. Sumi, H. Kamimura, A. Kubota, R. Shimada, S. Miyashita (R&D Center for New Hydrogen Energy, Inst. Applied Energy), A. Lipson, P. Tripodi, M. Miles, H. Watanabe (New Energy and Industrial Technol. Div. Organization), **"Excess Heat Measurements and Nuclear Detection Experiments in the NHE Program,"** p 96.

A research and development project, referred to as the "New Hydrogen Energy" project, was started in Japan in November 1993 with the main goal of reproducing and verifying the existence of excess heat generation, and of nuclear products during electrolysis in Pd-LiOD systems.

Four credible prior acts of excess heat measurement systems have been introduced, namely the ICARUS system developed by Fleischmann-Pons, I/J-fuel cell type system developed by Kunimatsu et. al, the SRI type mass flow calorimetry system (SRI-FCS) developed by McKubre et. al, and the INFN type electromigration mass flow

calorimetry system (INFN/EM-FCS) developed by Celani et al. Numerous and detailed experiments have been conducted using these reported systems together with many Pd material modifications. Simultaneously, a NHE type mass flow calorimetry system (NHE-FCS) having long period stability and reliability has been developed to confirm and verify absolute excess heat effects.

Excess heat levels of 8 ~ 18% of the input power have been observed with the I/J-fuel cell type system with relatively high reproducibility as reported in ICCF-6. To verify this excess heat measurement at the same electrolysis conditions, the NHE-FCS has been applied. However, these experiment confirmed the fact that the measured excess heat by the I/J-fuel cell type system was not absolute excess heat. The temperature of the measured point in the I/J cell was certainly increased, but no net heat output was observed by the mass flow calorimetry. The sensitivity and accuracy of the NHE-FCS and systematic error factors of the I/J-cell have been examined.

Detection of nuclear products such as γ -ray, X-ray, neutron, charged particles, and QMS analysis for T, He-4, and He-3 have also been performed to identify whether nuclear reactions were happening or not. Two parameter X-ray measurement system has been employed in-situ to detect any X-ray generated during electrolysis. Detailed

QMS measurements of the out-gas from heated specimens of deuterated Pd have been conducted to detect any nuclear products. However, no anomalous amounts of T were detected.

These experimental results will be summarized and discussed.

T. Matsumoto (Dept. Nucl. Engineering, Hokkaido Univ., Japan), "**Mechanisms of Electro-Nuclear Collapse**," p 97, 3 refs, 1 fig.

Many astrophysicists now believe that nuclear collapses occur far in the universe by the gravitational force. Since the force is the weakest one, a huge mass should be required for the collapse. However, the electromagnetic force is 40 orders stronger than the gravitational force so that the nuclear collapse can be easily induced in a laboratory by using various methods of discharges. The collapse could be called "Electro-Nuclear Collapse(ENC)." Here the mechanisms of ENC will be discussed based on the Nattoh Model,

1. Experiments inducing ENC
2. Processes for ENC
3. Tiny white hole
4. Regeneration of conventional elements
5. Ball lightning
6. ENC during earthquake
7. Super elementary particles
8. Miscellaneous.

It should be particularly emphasized that during ENC, conventional elements such as C and O can be regenerated. This fact has enabled us to discuss super elementary particles which could hardly sustain those structures during passing through a worm hole with a diameter of 10^{-33} cm.

T. Matsumoto (Dept. Nucl. Engr., Hokkaido Univ., Japan), "**Carbon Tubes and Films Produced in a Pb Electrode**," p 98, 3 refs, 2 figs.

Experiments of underwater spark discharges were performed with thin metal wires of Pb. Discharges were made under two modes of DC and pulsed AC. Ordinary water mixed with potassium carbonate and hydroxide were used as electrolyte solutions. Products were observed with SEM, and those elements were analyzed with EDX and EPMA.

Many remarkable products were obtained: interconnected electrons, transmuted products, thin C tubes, thin C films and hollow Pb balls. Here two processes of nuclear transmutation were separately observed: sequential e/p captures and nuclear collapse.

The C tubes and films were produced by the nuclear collapse in the Pb balls. It would be amazing that the conventional light elements such as C, O and Fe were regenerated by the nuclear collapse.

The mechanisms of the regeneration of elements by the electro-nuclear collapse will be discussed by the Nattoh Model elsewhere at ICCF-7(3).

T. Matsumoto (Dept. Nucl. Engr., Hokkaido Univ., Japan), "**Feasible Schemes of Electro-Nuclear Transmutation in Compressed Hydrogen Clusters**," p 99, 1 ref.

Nuclear transmutation easily takes place in a compressed hydrogen cluster that is formed during cold fusion experiments such as electrolysis or electrical discharges in water. Since the hydrogen cluster is at time in a special state, the "itonic" state, the schemes of the nuclear transmutation are significantly different from the conventional schemes with an isolated single nucleus. Here the feasible schemes will be described for the nuclear transmutation in the itonic state, that include the captures of electrons and/or protons, the emission of alphas and so on.

As examples, the feasible schemes are explained for the electrodes of nickel, titanium and iron, and the electrolytes of sodium and potassium. Furthermore, a multibody fission reaction will be discussed for uranium.

M. McKubre, S. Crouch-Baker, F. Tanzella (SRI Intl., Menlo Park, CA), "**Materials Issues of Loading Deuterium into Palladium, and the Association with Excess Heat Production**," p 100.

The hypothesis central to the SRI experimental calorimetry program is that maintenance of high D/Pd loadings at high cathodic current densities or currents, is an important factor in the generation of heat apparently in excess of known input heat sources. The results of more than 50,000 hours of electrochemical calorimetry experiments have been re-evaluated to determine:

- i) the effect of current and electrochemical current density on the absorption of H and D into Pd, as inferred from the measured resistance ratio.
- ii) the correlation between deuterium uptake and the appearance of anomalous excess power.

On first inspection, the results obtained appear to be highly irreproducible, signaling the presence of uncontrolled variables, at the electrochemical interface and, potentially, in the phases on either side: the electrolyte and the bulk metal phase. When appropriately normalized to exclude resistance changes not affected by deuterium uptake, it is clear that two extreme modes of resistance response to current (density) can be observed to occur under nominally identical conditions: Mode A, an approximately linear decrease of resistance with logarithmic increase of current; Mode C, a shallow decrease in resistance and symmetric increase with increasing (log) current. An intermediate category, Mode B, combines features of both Modes A and C.

We will discuss the reasons for, and significance of these behaviors, and the phenomenological association of the observed Modes of resistance/current response, and with excess heat production.

Melvin H. Miles (Chem.& Matls. Branch, Res.& Technol. Div., Naval Air Warfare Center Weapons Div., China Lake, CA), Benjamin F. Bush (Dept. Chem., Univ. TX, Austin), **"Radiation Measurements at China Lake: Real or Artifacts?"** p 101, 2 refs.

Anomalous radiation at China Lake was first detected by the exposure of dental X-ray films in two experiments producing excess power. There was no exposure of the film used in a control study during these experiments. There was also no exposure of similar films in more than 20 experiments where no excess power was present.

Anomalous high radiation counts were observed using several different Geiger-Mueller (GM) detectors as well as a sodium iodide (NaI) detector when electrolysis experiments using heavy water were in progress. These high radiation counts were often observed in co-deposition experiments where palladium metal is deposited from a D₂O solution onto a copper cathode in the presence of evolving deuterium gas. The anomalous radiation counts reached values as high as 73 sigma above normal background counts. Most experiments, however, gave normal radiation counts. No anomalous count rates were ever observed when experiments were turned off. There was always a decrease in the anomalous radiation when the detectors were moved away from the electrolysis cells. There was no observable change in the anomalous radiation when the scalar rate meters used in these experiments were switched to battery power and disconnected from the electrical lines. Finally, the appearance of the anomalous radiation always correlated with the expected time periods required to load the palladium with deuterium. For example, the anomalous radiation would appear within a few hours in the co-deposition experiments where the palladium is loaded with deuterium as it deposits from solution. In contrast, the appearance of anomalous radiation required days of electrolysis for the palladium rods that load much slower.

The question whether these anomalous radiation measurements are real or experimental artifacts stems from the fact that two similar detectors often gave different results in monitoring the excess radiation. One GM-detector would measure anomalous radiation while another GM-detector would be "blind" to any anomalous effect. A few experiments, nevertheless, gave simultaneous anomalous effects from two different radiation detectors.

G. Miley, G. Narne, M. Petra (Univ. IL, Fusion Studies Lab., Urbana), J. Patterson (CETI, Sarasota, FL), **"Energetics of Nuclear Transmutations During Thin-Film Electrolysis,"** p 102, 5 refs.

Prior electrolytic cell experiments using thin-film (~500-2000Å) metallic coatings identified a number of possible nuclear transmutation products following a several week run. Products with high concentrations were generally localized in four mass ranges covering A ~ 20-35; 50-80; 105-130; and 190-210. The excess heat measured during these runs was typically low for single coatings (≤ 0.5 W) and higher for multiple coatings. To explore the reaction energetics, results from runs using Ni, Pd and Ti coatings are examined in the context of RIFEX theory. The reactants are assumed to involve (p + metal film) reactions, forming short-lived intermediate nuclear "complex" states. These intermediate states then decay by a "slow" fission process creating the observed array of products. An overall energy balance is obtained by calculating by calculating the total binding energy associated with the measured product yields, less the total binding energy associated with the reactants, assuming conservation of nucleons. Assuming reacting p/metal atomic ratios of 0.5 to 1.0, the calculated output powers for the three coatings cited are in reasonable agreement with the experiment, especially considering the various error limits in the experimental measurements. This result corresponds to an excess energy of about $10^4 - 10^5$ eV metal atom reacted -- also in reasonable agreement with a 2×10^4 eV/Pd reported by Arata, but are higher than the 300 eV/Pd reported for typical Pons-Fleischmann-type experiments.

While the agreement of the overall RIFEX reaction energetics with our prior thin-film experiments using a variety of coatings is encouraging, an unambiguous confirmation of the mechanism involved requires additional benchmarks. Other relational aspects between theory and experiment include the characteristic mass ranges for high yield elements and the predominance of stable isotopes. These phenomena plus other characteristic reaction "signatures" will be discussed in terms of RIFEX theoretical predictions.

G. Narne, G.H. Miley (Univ. IL, Fusion Studies Lab., Urbana), J. Patterson (CETI, Sarasota, FL), **"Quantification of Isotopes using Combined Secondary Ion Mass Spectrometry and Neutron Activation Analysis,"** p 103, 5 refs.

Thin-film metal coated microspheres have been processed in the Patterson Power Cell™ and analyzed for possible nuclear transmutation products. Various metal coatings (Ni, Pd, Ti, etc.) employed were within 500-2000 Å thick, and required high precision analytical techniques to characterize the yields and isotopes in the base coating prior to and after a run.

A combination of Secondary Ion Mass Spectrometry (SIMS) and Neutron Activation Analysis (NAA) was selected for analysis. The NAA requires irradiation and counting of a calibration standard in parallel with the test sample for every isotope. Thus it is time consuming and was limited to measurement of select elements where standard procedures had previously been developed to give high degree of trace concentration. SIMS with ultra low detection limits could detect all the known isotopes in a

sample relatively rapidly, but giving relative concentrations and isotope ratios more precisely than absolute values. NAA, with comparably low detection limits (~0.1 ppt at best) offers immunity from matrix effects and provides a measurement of bulk quantities vs the local characteristic of SIMS. To calibrate the SIMS sensitivity, results were correlated (employing an empirical relative sensitivity factor (RSF) approach) with the measured NAA yields.

The SIMS typically probes an area of 125 μm x 125 μm , but the bead surface-area is three orders of magnitude larger necessitating a statistical approach. In addition an image quantification approach is being applied to average over variations in isotope concentration. A separate problem involves isotope fractionation which can distort the isotope shifts (SIMS vs. Natural) up to 4% for the light elements and to 1% for the heavier elements. However, for example in Ti film run, about 51 isotopes have statistically significant deviations from natural and are not within the uncertainty due to isotope fractionation effects. Also the measured increase in concentration of isotopes/elements after the run cannot be explained in terms of known impurity sources or chemical effects, even considering statistical uncertainties.

Mizuno Tadahiko (Fac. Engr., Hokkaido Univ.), Ohmori Tadayoshi (Catalysis Res. Cntr., Hokkaido Univ.), **"Measurements of Transmutation Elements on Several Metals by Strong Cathodic Electrolysis in Heavy Water Solution,"** p 104.

Many elements on Pd, R, Zr and Au electrodes were confirmed by several analytic methods after long time electrolysis in heavy water solution. For example, the reaction products on a Pd cathode with the mass number up to 208 are deposited which were subjected to electrolysis in a heavy water solution at high pressure, temperature, and current density for prolonged time. Extraordinary observations were the changes of their isotopic distributions in the produced elements; these were radically different from the natural ones on the Pd electrode. It means that a nuclear reaction had taken place during the electrochemical treatment. It is suggesting that a role of new interactions working between a proton and an electron, should explain the new phenomenologies that are experimentally observed in this study.

These masses were composed of many elements ranged from hydrogen to lead. The Elements were changed by metal and electrolysis conditions. For example, natural chromium is 4.3% Cr50, 84% Cr52, 9.5% Cr53 and 2.4% Cr54. But the Chromium found on the Pd surface was 14% Cr50, 51% Cr52, 2.4% Cr53 and 11% Cr54. Natural Isotopic distribution varies by less. than 0.003% for Cr. Essentially the same phenomenon was confirmed more than ten times with high reproducibility at high cathodic current density, above 0.2 A/cm². All the possibilities of contamination had been carefully eliminated by several pretreatment for the sample and electrolysis system. It may be concluded that a reaction can be taken during the electrochemical reaction.

D.W. Mo, Q.S. Cai, L.M. Wang, X.Z. Li (Dept. Phys., Tsinghua Univ., Beijing, China), **"The Confirmation of Nuclear Transmutation Phenomenon in a Gas-Loading H/PD System using NAA(Neutron Activation Analysis),"** p 105, 2 refs.

Phenomenon of nuclear transmutation in a gas-loading Pd/H(Pd/D) system has been studied for a long time by us. In past several years, we concentrated our attention to search charged particles, precursors and got some positive results. But it is difficult to repeat them every time. Recently, We concentrated our attention upon nuclear transmutation of metal Pd in Pd/H system. Through a long term treatment, nuclear transmutation happened in Pd of Pd/H system. For confirmation of it, a lot of experiments have been done. This paper reports about using NAA methods to confirm the nuclear transmutation phenomena.

Six Pd samples were tested. No. 1,3,4,5 came from Pd/H system, No.2 is original Pd. No.6 is pure zinc. The weight of each sample is about 10 mg. Each sample was cleaned, sealed in a small quartz ampule, respectively; then, put into reflector of Tsinghua University pool-reactor where the thermo-neutron fluence is $10^{12}\text{n/sec}\cdot\text{cm}^2$. They were irradiated for one and half hours; then, were taken out from reflector, and cooled for 72 hours. Their activity were measured with pulse-height(energy) spectroscopy with a HPGe Gamma Ray detector produced by EG&G ORTEC. The results was shown in Table 1.

Table I Activities of ⁶⁵Zn and ^{69m}Zn

sample	area of ⁶⁵ Zn (l. 1.155MeV)	area of ^{69m} Zn (438.7KeV)	ratio of area
No.1	1267 ± 16(counts)	143 ± 12(counts)	1.867
No.2	0	0	
No.3	1157 ± 34	245 ± 16	4.722
No.4	849 ± 29	537 ± 23	1.581
No.5	2936 ± 54	999 ± 31	2.938
No.6	5145 ± 71	1492 ± 38	3.448

These results told us:

- (1) Zinc is the dominate product of Pd nuclear transmutation;
- (2) The ratio of area different from No.6 sample (pure Zinc) means that every sample shifts its ratio of isotope(⁶⁴Zn/⁶⁸Zn), i.e. products of Pd nuclear transmutation have different ratio of isotope in companion with that of the natural Zinc;
- (3) The experiment is reliable. Zinc is not a contamination and does not come from natural environment;
- (4) There are some other peaks of Gamma Ray, for example ¹⁸⁷W, ¹⁹²Ir etc. These elements were not found in No.2 sample (original Pd).

R.A. Monti (Ist. TESRE-CNK, Italy, Burns Div..., Canada), **"Nuclear Transmutation Processes of Lead, Silver, Thorium, Uranium,"** 106, 4 refs.

The possibility to cause nuclear transmutations of stable isotopes by means of ordinary chemical reactions suggested the possibility to cause nuclear transmutation of unstable isotopes.

A first series of experimental tests was made from 1993 to 1995 with positive results .

In 1996 an industrial reactor was built in Canada and sent to Italy for a new series of independent tests at ENEA (Italian National Laboratories).

In these tests the production of Silver from Lead was used as a driver of the nuclear transmutation of Thorium and Uranium.

After the positive results of this independent tests (1997) a second series will be performed at the ENEA Laboratories, starting October 1997.

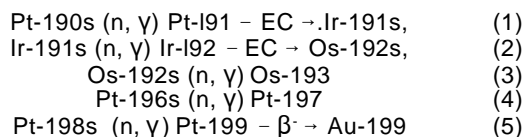
Detailed quantitative results of all these experiments and a description of the industrial reactor will be reported at ICCF-7.

R. Notoya, T. Ohnishi, Y. Noya (Catalysis Res. Cntr., Hokkaido Univ., Japan), **"Products of Nuclear Processes Caused by Electrolysis on Nickel and Platinum Electrodes in Solutions of Alkali-Metallic Ions,"** p 107.

A series of the phenomena providing the evidence of transmutation, i.e., tritium generation, nuclear reactions of alkali-metals and nickel, and positron annihilation occurring in electrolytic cells have been reported by many scientists, as well as anomalous large heat evolution. The aim of this work was to observe more detailed information of the nuclear reactions by longer duration of electrolysis and the simultaneous observation of gamma-ray spectra.

The experiments were carried out by use of the similar procedure as in our previous papers. An electrolytic cell used for the experiment was equipped with a porous nickel cathode and a platinum wire anode. Each electrolyte was a light, heavy water or a mixed water solution (20 or 30 ml) of 0.1 to 0.5 M alkali metal carbonate or sulfate. The cell was directly put in a measuring box for gamma-ray spectra equipped with a Ge-detector. The spectrum of the background was observed in the same condition of that of the test except for use of electrolytic current. Each observation of gamma-ray spectrum without electrolysis (background) or with electrolysis (test) was continued for 6 to 100 hours.

The gamma-ray spectra revealed the presence of several new products in particular generated by transmutation from platinum, for example, Os-193 with peak energy (73.0 k eV), Ir-192 (296 k eV), Pt-191 (351.2 k eV), Pt-197 (77.4 k eV), Pt-199 (186 k eV) and Au-199 (49.8 k eV). These species can be easily generated by the following nuclear reactions well known occurring in a nuclear reactor and the successive decay of the products:



where s means stable.

A liquid scintillation spectro-analyzer was available for determination of nuclear species which peak energy of gamma-ray was very small, for example, Ba-133m (12.3 k eV) observed after electrolysis in Cs⁺ solution.

TRANSMUTATION PRELIMINARY RESULTS

F. Celani (INFN-LNF, Frascati, Roma, Italy), M. Achilli, A. Battaglia, C. Cattaneo, G. Buzzanca, P.G. Sona (CISE spa, Italy), A. Mancini (ORIM srl Italy), "Preliminary Results with 'Cincinnati Group Cell' of Thorium "Transmutation" Under 50 Hz AC Excitation." Handed out at ICCF-7, courtesy of Ron Florez.

We performed, at the CISE Nuclear Laboratory from February '98, four experiments with the so called "Cincinnati Group Cell", which consisted of a Zr-Zr cell using a 50 Hz AC line current found in Italy.

The first two experiments where "blank" control runs that were mainly aimed to understand the intrinsic peculiarity of this kind of AC electrolysis.

In experiment #1, we added 80 mM of NaNO₃ and one drop (i.e. 20 mM) of 37% HCl to 25 ml of de-ionized water electrolyte. The experiment was performed following, as close as possible, the I-V-T protocol developed by the Cincinnati Group (CG). We experienced a very large and abrupt temperature and pressure increase which broke the safety valve. We then analyzed the material inside the cell and found nothing strange: only Zr, Hf, and Na. The cell was then mechanically cleaned by removing approximately 0.1 mm of the surface.

Experiment #2 was similar to #1 except that no NaNO₃ was added and we modified the I-V-T protocol to avoid a large pressure buildup i.e., starting electrolysis from as low as 10 V (not 50 V minimum according to CG protocol) and we waited to increase the voltage further until the current "naturally" decreased. Using this method, we reached voltages as high as 220 V instead of maximum of 177 V specified in the CG procedure. Subsequent SEM analysis of the particulate from this run showed only Zr, O, and C1. ICP-MS showed: Zr and Hf.

Experiment #3 was made using 25 ml of electrolyte that came from a solution composed of 100 ml of de-ionized water that contained one gram of Th (NO₃)₄*XH₂O plus 20 mM (one drop) of 37% HCl. Radiometric intensities of Th in the initial solution were 1.0 of ²³²Th and 12.6 of ²³⁰Th indicating that it was not only "natural" ²³²Th. The experiment was run for 55 minutes with I_{max} = 2.6A; V_{max} = 220V, P_{max} = 30psi. Subsequent qualitative ICP-MS revealed B, Cs, Hg, Cu, Na, Al, V, Cr, Ni, Zn, Pb, and Mn. A chemical balance indicated 18% of the original

Th was missing, and a radiometric balance (alpha + Beta) showed a 12% Th deficit.

Experiment #4 was made following, as close as possible, the CG protocol (except that we started at 10 V to avoid a repetition of the large pressure increase). The experiment ran for 55 min with $I_{max} = 4.8$ A; $V_{max} = 180$ V; $P_{max} = 190$ psi. Subsequent ICP-MS and ICP-optical analyses strongly suggests, based on our experience, that the results were very similar to experiment #3. Chemical balance showed 78 mg of Th remaining from the 102 mg initial quantity. **Other elements detected were ^{10}B and ^{11}B (3.2 mg), Cu (1.0 -1.5 mg) but not in normal isotopic ratio, ^{133}Cs (0.2 mg), and Hg (0.16 mg). The following elements were qualitatively detected: Na, Al, V, Cr; Ni, Zn, Pb, and Mn.** When we used only ICP-MS, several other masses appeared compared to when we used combined ICP-MS and ICP-optical analysis. A post-run radiometric balance (alpha + beta) showed a 14% Th deficit, but it did not have unusual unbalanced isotopic ratio.

Further studies are underway to more fully understand our preliminary results.

NEAR BOILING ELECTROLYTE

G. Mengoli, M. Bernardini, C. Manduchi, G. Zannoni, "Calorimetry Close to the Boiling Temperature of the D_2O/Pd Electrolytic System," *J. Electroanal. Chem.* 444 (1998) p 155.

AUTHOR'S ABSTRACT

This team of electrochemists and physicists decided that a hot near-boiling electrolyte might be the secret of reproducibility for excess heat, and tested the idea. Their cells operated at about 95°C and due consideration was given to the heat of evaporation of the water etc. The calorimeter was kept at the operating temperature by additional heating with a heating coil, whose power was adjusted so as to keep the temperature constant. They also - emulating the F&P "heat after death" report - checked the effect of cutting the current. Constant current was used, and the cathodes were platelets and 4mm rods of Pd. The electrolyte was K_2CO_3 , the reasoning being that alkali would attack the glass; so no Li was present in these experiments. Nor were there any high D/Pd loadings. In most runs, excess heat was found and found to go on after the current was cut. Rods were less effective than plates, due perhaps to their smaller surface/volume ratio.

COLD FUSION TIMES

Contents, vol 6, no 2, Spring 1998.

K. Kuroiwa, Y. Ohtsu, G. Tochitani, H. Fujita, "Experimental Investigation on Loading Ratio D/Pd Using High Pressure and Deuterium Glow Discharge Methods," *Rept. Fac. Sci. Eng., Saga Univ.*, vol 26, 1997, pp 33 (Japanese, Engl. abstract), *CFT*, pp 8, abstract.

A 12.5 x 12.5 x 0.2 mm plate of 99.9% pure Pd was mounted in a chamber and deuterated with D_2 gas at up to 6 atm pressure. This achieved D/Pd ratios of about 0.75 after 50 hours or so. The Pd sample was then weighed at intervals while being kept in air, and did not lose much deuterium. For the glow discharge, it seems to have been done at 20 Torr and 10 mA through a 50 kohm resistor, i.e. about 500 V total applied. The results of this are not clear to this abstracter. The abstract says that after glow discharge charging, the ratio was kept at 0.70°C by cooling the Pd sample.

R. Lu, "The (d,d) Fusion in Solar Flares," *J. Qingdao Univ.* (1997), vol 6, pp 70 (Chinese, Engl. abstr); *CFT*, pp 8.

The author refers to F&P-89 and this paper is meant to relate to cold fusion: temperatures in solar flares are essentially "cold" compared to those assumed to be required for plasma dd fusion, so if it took place there, fusion would be cold. Lu believes that there is evidence for dd fusion by (it seems) 3He detected in some flares.

D.S Shelton, L.D. Hansen, J.M. Thorne, S.E. Jones, "An Assessment of 'Excess Heat' in 'Cold Fusion' Calorimetry," *Thermochim. Acta* 297 (1997)7; *CFT*, pp 8, abstract.

The Jones and coworkers team takes a close look at how CNF calorimetry has been done. They point out several weaknesses in prior designs, and design a calorimeter of their own. Theory is outlined. It turns out that stability and repeatability of a given design are no guarantee of good performance. Every calorimeter should be checked using a chemical reaction of known enthalpy, yet this has not been done previously. Simple calibration using electrical heating is not sufficient. Inadequate mixing might occur and thus temperature gradients in the commonly used cells, making any results quite unreliable. Another defect has been unstable heat paths. The authors suggest that purported excess

heat would not be observed if calorimeter design were improved along the lines described in the paper.

Z. Zhang, F. Liu, M. Liu, Z. Wang, F. Zhong, F. Wu, "Calorimetric Studies on the Electrorefining Process of Copper," *J. thermal Anal.*, vol 50 (1997), 138. *CFT*, pp 8, abstract.

In this work, the Chinese team use a cell and calorimeter rather like that of F&P, and the work is motivated by F&P CNF results. Instead of calorimetry in Pd / D₂O, they applied it to copper deposition. They find that there is excess heat, roughly linear with current density, and conclude that something anomalous is going on, some unknown process; and that thermodynamics might be wrong.

T.V. Prevenslik, "Sonoluminescence: Microwaves and Cold Fusion," *Nucl. Sci. Tech.* 8 (1997) 94; *CFT*, pp 8, abstract.

The author continues his theoretical work on sonoluminescence, which he believed may be accompanied by cold fusion. He states that microwaves may be generated and cause some cold fusion, though not much. However, high power pulsed microwaves aimed at the bubbles might increase the cold fusion rate. He suggests research using MW sources at 1/35 Ghz pulse width of 1 ns and a rep rate of 10⁴ Hz.

Noboru Oyama, Osamu Hatozaki, "Nuclear Fusion Induced by Electrochemical Reaction," *Oyo Buturi*, vol 60, no 3, pp 220-226 (1991); *CFT*, pp 10, abstract.

Attempts have been made by large number of research groups throughout the world to duplicate the electrochemically induced nuclear fusion proposed by F&P, Jones et al. However, there have been both positive and negative results during the past two years. Such a situation seems to originate from the lack of reproducibility of the results, and, therefore, many factors such as electrode materials, electrolysis conditions and detection methods should be clarified to realize cold nuclear fusion. A brief history of the development of this research subject is described and the basic information regarding the electrode reaction of the D₂O electrolysis using a Pd cathode is presented for further clarification of this phenomena.

Akito Takahashi, "Production of Neutron, Tritium, and Excess Heat," *Oyo Buturi*, vol 62, no 7, pp 707-109 (1993); *CFT*, pp 10, abstract.

Major results obtained up to now in cold fusion experiments are introduced for neutron, tritium and excess heat generation. Neutron spectra show a 2.5 MeV peak and a 3-10 MeV continuous component. An anomaly is also shown in the n/T ratio of 10⁻⁴ to 10⁻⁹. The production of excess heat has been confirmed in many laboratories.

Rad-Waste Issues

WHY DOE IS STUCK ON GLASS PLANTS

By Hal Fox

Governor Gary Locke of Washington state threatens to sue the federal government if there are more delays in the cleanup of the Hanford Site [1] (near Richland, Washington) on the sandy/gravelly layer in the bend of the Columbia River. This is the place where DOE scientists (political scientists?) have assured the people that even with the high-level radioactive liquids leaking into the Vadose layer (the name of the gravel bed on which the tanks are imbedded) it would take 10,000 years for the radioactive liquids to reach the ground water. **Guess What?** Some of the radioactive liquids from the leaking tanks are already into the ground water **and on the way to the Columbia River!** For a report see reference [2].

After DOE paid for an extensive and expensive study [3] on methods of handling nuclear wastes, the study made the conclusion that there was no known method more cost effective than geologic storage. This author doubts if any scientists in their right mind would ever claim that storing a high-level waste for 10,000 years could be cost effective. The only rationale could be that such a scientist (or non-scientist) is forecasting that there will be no new discoveries for the stabilization or transmutation of radioactive materials in the next few decades or centuries. **The truth is that such a new technology is already being demonstrated in a variety of laboratories!**

Based on this highly biased study [3] (possible guided to this conclusion by some representatives of

DOE contractors) the DOE has zeroed in on just one glorious answer: Encapsulate the high-level radioactive wastes in glass. Note that in the past 50 years the high-level wastes have been eating through stainless steel shrouded in concrete, have destroyed the ability of salt beds to contain the wastes, and have never been tested for even a few decades in glass. However, assume that the glass is inert to high-level radioactive wastes and all of the possible elements that are produced under long-term radioactive decay. What clever approach has the DOE taken?

Because of the inability of the DOE and its contractors to meet schedules, the DOE has proposed that one or two corporate teams be selected to build glass plants **at their own expense**. Then when the plants are operating the DOE will pay a premium price for each pound of high-level radioactive waste that is encapsulated in glass (and presumably) prepared for shipment to a national disposal site (such as Yucca Mountain, which will be ready about 2010 if they don't find more problems with earthquakes and circulating water).

Two big companies are bidding to build glass plants at Hanford: BNFL, Inc. and Lockheed Martin Advanced Environmental Services. Geoff Harvey (BNFL) and Linc Hall (Lockheed team) and Mike Wilson (Washington State Dept of Ecology) all agree that if there is a cut in the Hanford Site budget that it would send discouraging signals to Wall Street investors (who plan to finance the construction of the glass plants). If Wall Street investors have their head up their asphalt to the extent that they do not know what is going on in new-energy discoveries, then it is their own fault if they fund glass plants that will become white elephants (and no hay) due to the development of technology for the on-site stabilization of radioactive wastes.

Therefore, put together DOE bureaucrats who do not make decisions (except by hired committees); big corporations with Washington lobbyists; a Tri-City area adjacent to a large government operation and benefitting from payrolls; and promised lucrative, long-term glass-plant funds from DOE, what will be created? Obviously, a barrier to any new technology! Surprised, anyone?

References:

- [1] John Stang, "Hanford tank waste program under fire -- Gov. Locke lawsuit threat looms over cleanup", *Tri-City Herald*, May 5, 1998, pp A-1, A-2.
- [2] S.E. Kos, J.R. Brodeur, et al, "Hanford Tank Farms Vadose Zone --TY Tank Farm Report",

January 1998, Report GJO-97-30-TAR, GJO-HAN-16, US DOE, Richland Operations Office, Richland, WA. [3] Nuclear Wastes: Technologies for Separations and Transmutation, Committee on Separations Technology and Transmutation Systems, Board on Radioactive Waste Management, Commission on Geosciences, Environment, and Resources, National Research Council, published by National Academy Press, Washington, D.C. ©1996 by the National Academy of Sciences.

THE COST OF N-WASTE DISPOSAL

Courtesy of Richard Shamp

Disposal and Storage of Spent Nuclear Fuel -- Finding the Right Balance, A Report to Congress and the Secretary of Energy from the Nuclear Waste Technical Review Board, March 1996.

EDITOR'S COMMENTS

The Congressional Budget Office has estimated that the initial five-year cost of developing and operating a centralized storage facility would be approximately \$1.2 billion. In addition, it is estimated that it will cost approximately \$250 million per year to operate the facility at full capacity. This later figures includes the transportation of 2,000 metric tons (2200 tons) of spent fuel to the facility each year. In addition, the DOE plans to spend several billion dollars for making glass plants and encapsulating the high-level radioactive wastes in glass.

The latest best estimates for the on-site reduction of high-level radioactive wastes was less than \$1,000 per kilogram (2.2 pounds). Assume the cost of \$1,000 per kilogram of waste for on-site stabilization. The costs for the processing of 2,000 metric tons (2200 tons) per year would be 2,000 (metric tons) times 1,000 (kgms/ton) times \$1,000 (\$/kgm) or \$2 billion according to the present estimates. The 1995 estimate of \$600 million for a centralized storage facility is in addition to several billion dollars already spent on drilling and studying the Yucca mountain area to prepare for a centralized disposal facility. In 1995, a study reported that the storage (not disposal) costs are typically about 15 to 20 percent of the overall waste management costs of \$30 to \$35 billion (includes construction, operation and closure of a nuclear power plant). The problem with these figures is that the estimated cost increases every year. Using the cost of \$1,000 per kilogram for on-site stabilization of high-level radioactive fuel pellets, the estimated costs for 2,000 metric tons per year

(current accumulation rate of spent fuel pellets) would be \$2 billion per year. With the advent of new-energy devices and systems, there should be no new nuclear power plants built and the older power plants should be shut down. Therefore, the \$2 billion per year would gradually clear up the stockpiled spent fuel pellets and the costs of storage and/or disposal would cease.

With the present DOE plan, there would be storage and/or disposal costs for 10,000 years. Without any question, if the current accumulation (of about 40,000 metric tons) of spent fuel pellets can be stabilized for \$40 billion, then that is the process that should be pursued. With a well-managed, and competitive development program, it is highly likely that considerable cost reductions in the stabilization process could be found and used.

Miscellaneous

TWO-FIFTHS OF WORLD ENERGY IS OIL

Courtesy of Gordon B. Moody

This circle graph was derived from graphs and data from *Global Energy Outlook*, vol 3, no. 5, pg 7. As shown in Fig. 1, Oil consumption provides for 40% of all of the world's energy. During 1997, world oil consumption increased by 2.6 percent. Coal is next by providing 27% of the energy needs. Natural gas provides 24% of the world's energy. Nuclear energy provides 7% and the hydro-electric plants provide 2% of world energy. Almost no one is worried about running out of coal or water power. Natural gas is

Crude Oil Represents Two-Fifths of All World Energy Consumption

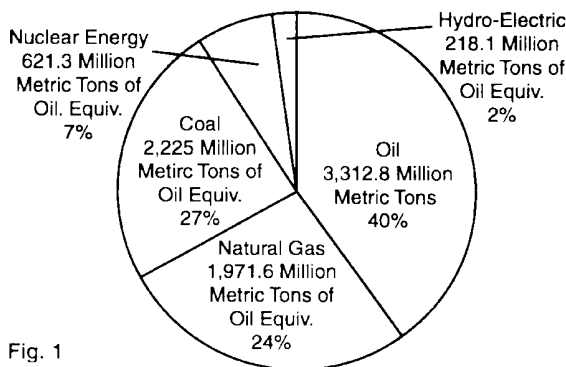


Fig. 1
Source: British Petroleum Statistical Review of World Energy 1997, as seen in *Global Energy Outlook*, May 1998

one of the least polluting (next to hydro-electric) of energy resources and is becoming the major energy source for many communities for heating home, offices, and factories.

In many places, where pollution from burning coal is being curtailed, the replacement energy source is natural gas. While some new nuclear power plants are being built outside the U.S., there are none being built nor currently scheduled for construction in the U.S. The concept of building a plant that produces high-level radioactive waste that could be harmful for 10,000 years is not an acceptable energy-producing alternative. The next major change in the way we produce and use energy will come from various forms of new-energy sources.

WORLD REPORT: \$ RICH, ECOLOGY POOR

AP Staff, "World is economically richer, ecologically poorer than ever", *Deseret News*, 10 May, 1998, pgs A-1, A-5.

EDITOR'S SUMMARY

Lester R. Brown, president of Worldwatch Institute, reports that for the third year in a row, the world's economy has grown 4 percent or more. World income per person should reach \$5,000 this year. **However, ecological problems plague the world. Carbon dioxide and other carbon emission concentrations in the atmosphere are still rising. Weather change plague parts of the world,** some with drought, some with floods. Shrinking glaciers and melting icecaps appear to be problems. The health of the biosphere suffers. New-energy sources, the most important development of this century, have capability to lessen the impact of man's increasing use of energy by decreasing the use of fossil fuels. This coming impact of new-energy developments can begin to reverse the deterioration of the world's biosphere and provide for a more healthy and prosperous world.

FLUCTUATING OIL PRICES

Courtesy of Gordon B. Moody

Gordon B. Moody, "Editorial," *Global Energy Outlook*, Vol 3, No 5, May 1998, pg 1.

GORDON MOODY'S EDITORIAL

Asia now consumes more than a third of total world energy demand. Crude oil markets were the first to be hit hard by the financial crisis that gripped Asia.

The impact of the crisis is now spreading to other markets, including manufacturing and the high-tech computer-chip industries with profits considerably lower than a year ago. The oil service industries, while impacted, were much more immune to the Asian virus, doing better than predicted by analysts. The U.S. economy continues to surge into its 8th year of expansion, almost oblivious to the troubles in Asia, but eventually the stock market will be impacted by lower corporate profits. In the meantime, new opportunities are available in Latin American as more countries open their markets to privatization and trade. Oil markets could well be the first to recover as Asia's economies get back on track, beginning with major improvements forecast for 1999. While times may not be as good as a year ago, energy industries may soon find it more difficult to keep production abreast with increasing world energy demand.

ADVANCED ENERGY CONVERSION THEORIES, DEVICES, AND RESULTS

by Pat Bailey

Trevor Osborne <wharmony@omen.com.au> recently sent an email calling attention to the NASA Breakthrough Propulsion Physics Program, under the direction of Marc Millis

I now call your attention to a summary assessment of all the new devices that the Institute for New Energy is aware of, where we have received data on any device - and have ranked these devices by: Ranking by Interest, and Ranking by Commercialization Potential; as well as listing by Device Name and Inventor's Name (so we have four databases listed, where each device is a link, and each link leads to a summary file of all the data we have on that device!).

We currently have about 114 devices listed, and want to include more.

See: <http://www.padrak.com/ine/DBGUIDE.html>

Check on the data that is listed for the devices that you know about.

Email me changes if the data is out of date. Add new devices if you have accurate information.

Use the handy update INE Database form that resides at:

<http://www.padrak.com/ine/DBTEMPLATE.html>

WHAT IS THE TRUTH ABOUT GLOBAL WARMING

500 million years ago carbon dioxide was 500 times higher than now. 300 million years ago CO₂ was at its lowest level, then rose to 4 to 5 times present level and has been decreasing ever since. CO₂ level is strongly influenced by sunspot cycles. When the limits to plant growth are shown to be the amount of carbon dioxide and not the amount of light, the close tracking between CO₂ and sunspot cycles is not understood. Do we really have an intractable case of global warming, or are we headed for another ice age. This is still an open question.

If you don't do it - it will probably not get done! Let's do this right!

Thank you.

Patrick Bailey
President, Institute for New Energy

Good summary review papers are at:
http://www.padrak.com/ine/BGH97_1.html
http://www.padrak.com/ine/BGH97_2.html
<http://www.padrak.com/ine/HAARP97.html>

INE WEBSITE: OVER 300 VISITS PER DAY

Patrick Bailey reports that the INE Website is continuing to receive about 300 visits or "hits" per day on a daily average basis. Since the website "hit counter" was installed on Jan. 17, 1996, the website has had over 221,500 visits! A plot of the hits vs. time, tallied weekly, shows a linear and increasing trend. Also, since the counter is only set up on the main page, we are probably getting more visitors per day than that, for those users that link straight to the "Revisions" page and then go from there to the various new files that are posted each month. *NEN* congratulation to the INE Website, which has also won several internet awards! The INE website is at: <http://www.padrak.com/ine/> .

DERIVATION OF THE SPACE-ENERGY EQUIVALENCE

Nelson Zink

With the increasing interest in zero-point energy and similar concepts, it is natural to wonder how much energy space might contain. A formula for the space-energy equivalence may be derived as follows:

The universal gravitational constant (G) is an expression of the relationship between space and mass. Fundamentally, G is the space-mass equivalence. Expressed dimensionally, $G=L^3 / MT^2$ where L = length, M = mass, and T = time.

Bringing the quantity to unity, it can be written $M = L^3 / T^2$ and simplifying, $M=rC^2$ where C = the speed of light (L/T) and r stands for a radius (L).

Substituting M into the mass-energy equivalence ($E = m C^2$) yields $E = rC^4$ where E = energy.

Thus, the total amount of energy contained in a volume of space defined by a given radius is equivalent to the radius times the speed of light to the fourth power.

Written in dimensionally balanced form, the space-energy equivalence is $E = rC^4 / G$.

Nelson Zink zink@newmex.com

REJOICE FOR THE HYPERCAR

Dave Reed, Editor, "Halfway to Hypercars -- Automakers Are Already on the Right Road", *Rocky Mountain Institute Newsletter*, vol XIV, no 1, Spring 1998, pp 1-3.

EDITOR'S SUMMARY

The concept of using a combination of battery power and a small engine that runs at peak efficiency to charge the batteries is the essence of the hybrid vehicle. Plans are for such autos to get 60 to 80 miles per gallon. High structural strength with light weight is achieved by using modern super-light construction materials. All use low-drag styling and special drive wheels, such as installing the electric drive motors directly in the wheels. The Rocky Mountain Institute has been quietly urging the development of Hypercars since 1991. They now are rejoicing that such vehicles are in the advanced prototype stage and, in one case, Toyota's Prius

hybrid went on sale in December 1997 in Japan. RMI predictions are that hybrid vehicles will have one-third of the world market by 2005.

This newsletter rejoices in the development of the hybrid autos -- but for a different reason. We know that the time is not far off when new-energy devices will be able to provide the on-board battery charger that will eliminate the gasoline-burning, polluting engines that are now being designed into the current hybrid vehicles. **However, it will be relatively easy to swap out the engines and install the on-board battery charger based on new-energy technology.**

HUMAN GENOME IN 3 YEARS!

Staff, "Scientists plan to map full DNA within 3 years", *Deseret News*, 10 May 1998, pg A1.

EDITOR'S COMMENTS

The board of directors of Perkin-Elmer Corp of Norwalk, Connecticut has approved the funding of a project to map the entire DNA of man (human genome). Their estimate is that the task can be completed within three years. This estimate compares with the current estimate for sequencing the human genome by government-funded reserchers that it will require another \$3 billion and take until 2005. **Once you turn loose the ingenuity and freedom of unfettered scientists, marvelous results can take place.** The key is that those who control the purse strings must make a decision to support good scientific efforts.

Just think what enormous progress could be made to solve the world's energy problems if the task were taken out of the government laboratories and placed in the hands of qualified scientists, unfettered by bureacratic controls and their enormous demands for paper work. Add the flavor of scientific integrity, the opportunity to publish, honest treatment of patent applications, no well-funded organized protection of the status quo, no money spent to attack the originators of new science, and no monies paid to "hatchet journalists" to destroy new developments. None of these desirable parameters of free science has been widely available today for new-energy developers. **However, the good news is that new science can only be delayed not destroyed.**

Letters

LETTER FROM: BRIAN MAY

I've just read over a number of the articles at www.padrak.com/ine/index.shtml#new_5_8_7

There seems to be a lot of problems getting these new technologies to market...Govt seems to block registration of the Inventors Ideas. Companies seem to want to stick with conventional technologies. Has anyone said to heck with them and put out some simple kits that could be applied?

Say a cold fusion cell that will put out 1 HP or a 1 HP cap motor that uses standard mounts to replace a standard electric motor. I worked for Heath kit at one time, we had color TVs, Microwave ovens, Test Equipment, etc., all built from Kits... Why not a cold fusion kit? If the Kits are sold on the Net from a country that is not friendly to the US, there is little that the US could do to stop sales. Once enough kits are sold, they would get back into the US and the Govt would be forced to allow open sales of the product.

The inventor would not get all that is coming to him in cash terms but he would get the satisfaction of getting people to use his idea and that's what it's all about anyway. The inventor of a new technology seldom gets the money.

Brian May <bmay@mb.sympatico.ca>

Dear Brian May,

The government is not preventing new-energy devices from being built nor commercialized. In the case of cold fusion, it has been the hot fusion scientists (acting as political lobbyists to protect their flow of \$500 million per year for hot fusion research) that have organized the anti-cold-fusion campaign. The end result has been that both the hot fusion community and the cold fusion community have suffered.

Many devices that are claimed to be over-unity are denied patents by the patent office because of the strong acceptance of standard science. Until some good scientists demonstrate otherwise, the patent office should accept standard science. Remember that in 1929, T. Henry Moray sent in a patent

application for what we now call a transistor. The patent office rejected the patent with the comment, "It has no heater, therefore, it could not work." (Vacuum tube technology was well understood.) Moray abandoned the issue rather than disclose his discovery and transistor technology was delayed for another 16 years. (1945 transistor invented by Shockleg-Bell Labs.)

If any inventor out there has a demonstrable device and is willing to have it tested by an independent, reliable scientific group, then that person should let us know about it. We will ensure that the inventor is protected, that the device gets a fair test, and that the results are made known to the inventor and to the world. **But don't come to us with just a great idea. We have more ideas of our own than we can handle, we don't need unproven ideas from other groups. You must have a working model to get our help.**

Your idea of a kit is a good idea. There are three groups that have kits that can be obtained, CETI, Jet Technology, and ourselves. They all work, but none of them are up to the 1 kW level. The cheapest, and the most promising, in our opinion, is the LENT-1 Kit (Low-Energy Nuclear Transmutation Kit). But to be a part of this important scientific development, you will need to spend about \$25,000 for laboratory equipment to make the kind of measurements that will help make real scientific progress using this remarkable discovery.

Hal Fox, Editor *NEN*

LETTER FROM JERRY DECKER Self-Running Lawnmower Engine

Thanks for that elucidation of the internecine backgrounds of the various organizations. It all is much clearer to me, and if I had to put my money on it, the INE is the one I would back. The meetings are just the most interesting I've ever been to, especially the after hours talks. I take all pains to attend each year and will do so this year with the Salt Lake meeting.

I almost had a guy with a self-running lawnmower engine ready to bring it to show. He has it working and it takes 8 amps to generate continuous hydrogen to keep it running. Connected to a generator, it produces a sustained 15 amps at the same voltage. He has had the thing running on its own for more than a week at a time and sustaining a load at the

Advertisement

cross section AA

cross section AA

Shown are cross sectional models of the electron and the positron. See if you can spot the essential difference between negative and positive charge. Clue: negative and positive charge are simple repeating patterns on the periphery of the particles. All the more complex repeating patterns form neutral charge.

Einstein once said that God does not play dice with the universe and he spent the remainder of his life looking for the underlying determinism. I found the underlying determinism in the form of deterministic internal structures for the particles. The book is called the Theory of Elementary Patterns (TOEP) and particle models for all of the stable particles are presented. The premise of the theory is that all of the elementary particles listed in the physics books are not elementary particles but are elementary patterns of one much smaller elementary particle. In other words one elementary particle put together in various patterns form all of the substance of the universe and is responsible for all of the phenomena of nature.

I discovered that neutrino decay is a robust energy source as is quite possibly behind the Biblical event that is to occur soon. I discovered a second spectrum of photons. I have particle models for all of the stable particles and there were some surprises. I found the familiar four forces of nature plus a few more.

My physics teacher in high school once said that the why questions of physics would never be answered. Examples: Why can't a quark be isolated for study? Answer: A quark is an elementary motion of the one elementary particle and there are eight quarks two of which are forbidden under most circumstances. I canceled the Super Conducting Super Collider project and saved the US government many billions with that answer.

For a copy of my book send check or money order in the amount of \$20 US funds (\$15 plus \$5 S&H) to the following address. Idaho residents add 5% sales tax on the \$15 (\$.75). Please do not forget your mailing address. Allow 4 weeks for delivery.

Dan Siedelmann, 185 South Ridge Ave., Idaho Falls, ID 83402 no phone calls please

same time. But he says I'm 'moving too fast', that he's been working on it since 1968 and he's 'not ready'. I hoped everyone would see something unique this year. He says he mixes the hydrogen with outside air and has to adjust the timing of the

engine to make it work right. I'll keep you informed, always have my eyes out for anything that can be demonstrated at INE. **It would be a great draw for the conference and show everyone that O/U IS**

possible. Now, I plan to work on my spare lawnmower engine trying to duplicate this.
Free-Energy Books

With regard to the book 'HIGH VOLTAGE AND FREE ENERGY DEVICES' from John Snell \$20.00 US. I am sure if you send John a letter with your concerns, he would gladly give you back your money.

I found the book excellent... it has DETAILS (much like George Wisemans books) on how to build high voltage coils and experiments for the intense repulsive effect noted by EV Gray, it has **details** on the water arc experiments (pioneered by Peter Graneau and Richard Hull). My only reservation is the inclusion of 'free energy devices' in the title... but I've spent much more for a lot less **details**.

It never ceases to amaze me how people truly expect a working free energy device for 20 or 30 bucks....I hear it and have been suckered in many times...heck, all I want is a proof of the principle, not the whole thing to power your house (though that would be nice too).

Some people when they buy the info and aren't given the world on a silver platter, they become upset....well, Duh.... Anyway, I've learned over the years **not** to remotely **count** on actually getting plans in this fashion that work...however a few are interesting. The only way we'll see it, is if it **freely** released, even with a shareware option, where you can **prove** it for yourself.

The material in the Snell/Moonghie book I had not seen described or detailed anywhere else so in my opinion (and I've been at this for about 30 years with not one flipping bit of proof, **still**), the book is worth the price and worth keeping in MY library.

I don't know if you've seen the video of the one cylinder lawnmower engine using this high voltage coil discharge method, but it is enough to run the engine. The video is from Creative Science labs....in it they show an improved version with four coils mounted on arms on a central axis....of course, they **claim** it is overunity.

Bottomline, I paid nearly \$20 for the book and was very pleased with the content. As much as I was tempted to lift some of the construction details to HTML files, I have resisted out of respect for the authors and their providing of the info in the book form. So, if I could get this kind of detail in the majority of the books and magazines I spend money on, I'll gladly do it.

Unfortunately, of all that I've bought, perhaps 3% to 20% of any book or magazine has useful information. Its just the way it is. --

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LETTER FROM: dphend@juno.com
Stored Momentum in the Shaft

I would like to refer to your statement concerning "A Momentum Producing Machine" on page 122, *Journal of New Energy*, vol 2, nos 3/4. I don't believe the momentum is transferred to the bobs, I think the momentum of the arrow shaft is lost.

The shaft is positioned 10.2 cm below the solid bar, and the bob's center of mass is 110.0 cm below the shaft. Therefore the rate of motion of the shaft is small in comparison to the bobs, ($10.2 / 120.2 = .085$). Let's be generous and give the velocity relationship a value of 0.1 (the shaft is moving 1/10 as fast as the bobs). The shaft has a mass of 17.8 g, with the wire attachments lets say it is 22.0 g. The bobs have a combined mass of 8,230 g. Therefore the mass relationship is $22.0 / 8,230 = .0027$. This gives us a momentum relationship of $0.1 \times .0027 = .00027$. 27/100,000 of the momentum is lost by stopping the shaft, an insignificant quantity. The same can be said about the small amount of suspending wire that is also stopped.

I think there is a momentum loss from the stopping of the shaft, but it is not very large. At any rate, there is not enough momentum in the shaft to figure it in as a possible source of stored momentum.

LETTER FROM DON KELLY

This letter is an advisory that the Gravity Drop Tests of 1990-1994, will be reintroduced by *Electric Spacecraft Journal*, c/o Charles Yost.

Apparently Charlie has seen enough merit in this phenomena to rerun these G.D.T's, but centered only on the all-magnetic drop tests which were the most valid of the full series of tests. The major factor that was missed back in the 1990-94 time frame was that it was not nearly sufficient to test just one or two sizes of test plates, but many sizes are needed,

particularly in the larger sizes of 5 to 6 square feet, and up.

The G.D.T. work of Richard Hull and the theory of Martin Holwerda of Holland (i.e., his Gravitational vortex) concept are most important to the original G.D.T's since they expanded on the test plate size factor which was originally missed! Richard Hull is one of the very few, excellent researchers today, who will run test/experiments on a concept, if he believes that there may be some merit in testing it.

While his "drop like a rock" experiment tended to disprove the concept, this was not the true case, since it showed the starting point, or minimum "anchor" for the evolution of a results test curve.

Martin Holwerda's "gravitational vortex" theory provides for the projection for successively slower drop rates, as the test plate sizes increases.

Some examples of the comments and peer review responses are available. I now clearly see the blatant hostility that Pons and Fleischmann ran into with their "cold fusion" project work, as per the *Infinite Energy*, issue, Vol 3, No. 1, 1998, pp 44-45

While these G.D.T's are probably not as important as C/F, due to the various spin-off projects that C/F has inspired, they do point out a key area of anti-gravity R & D at this point. Why should all this work be centered at Area 51, Groom Lake?

These G.D.T's attracted the same type of blatant hostility as C/F since there was no clear cut antecedent basis for them in the present physic field, and in the textbooks! There seems to be some kind of "mental block" among establishment physicists in this area of new concepts, when they can't seem to find some kind of prior art to tie it to!

A major point that these various peer-reviewers all seem to miss is the extremely high magnetic induction levels of a single neodymium permanent magnet, and when arrayed in a seven-by-seven (49) pattern, the total magnetic induction is huge! If these damn fools don't believe that such a huge magnet does not react with the Earth's natural N-S ½ Gauss, and the E-W-ELF flow, then we are all in deep doo-doo as we begin to move into the next millennium!

D.A. Kelly for SEA

LETTER FROM RON KOVAC

I want to let you know that progress is being made here in Denver and Boulder to set up the Denver Institute for Advanced Studies funded by the company called Boulder Recycled Lab Equipment.

We are now moved into the new building I bought in Denver. The web site (first try) is a 24 page catalog of used equipment for research and experimenters:

See www.labused.com.

Any help you can give to advertise the web site would be very much appreciated. I enjoy reading of your successes and wish you good fortune.

Sincerely;

Ron Kovac (ronkovac@aol.com)

LETTER FROM P. T. PAPPAS

Finally I picked up on Cold Fusion, mainly after the indication that my PAP-IMI (Ion Magnetic Inductor) triggers biological transmutations. This is my main subject now, both experimentally and theoretically. Also, for fun, I am looking to Gold Fusion, too.

I managed to do C to Fe and other elements which I show to non-believers in a few minutes.

PAP IMI also produces 20% excess heat on the probe alone, not counting other loses all around which certainly should make this figure more than 2-3 times bigger. But who cares about heat. It was also producing water from the beginning which made me to develop a draining system in it to get rid of it. No doubt it does cold fusion, not so cold though, as the energies are in the range of 30 Kev.

Do visit my sight <<http://www.papimi.gr>>

We are constantly pouring data into it. Emphasis is given to Biological Transmutations – certainly cold fusion. Please, list it to your site and/or other places for people to visit.

I am also attaching for you and possibly for *JNE*, if that is appropriate, my last minute contribution to ICCF-7 with the title: **Electrically induced fusion in the living cell**. Also associate this paper to "Our Cancer Theory" posted in the web site. Also check in the cases section: "Lung Cancer Case," treated in Santa Monica. It relates to it and makes a good subject for *NEN*.

P. T. Pappas,
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<http://www.papimi.gr>

[The editor visited Dr. Pappas when he was working with M.D.'s from UCLA in Santa Monica. ED]

LETTER FROM ROGER K. PARR

Over Unity Measurements

I have often wondered if claims for over unity effects in electrical apparatus have resulted from incorrect measurement techniques, especially where there are complex current and voltage waveforms. My attention was drawn to this issue in an article in *Electronic Design*, April 6, 1998, "Pease Porridge," see Puzzler #2 and the answer set out later in the article. There is reference to a web site Don Lancaster's GURU'S LAIR home page, where there is reference to this issue under Guru's Lair: Tech Musings library directory, see Tech Musings #112. Here the correct derivation of power under these conditions is described.

This information may be of interest to people undertaking these measurements.

Regards, Roger K. Parr <RKPar@worldnet.att.net>

Dear Roger Parr,

You are absolutely correct. The most frequent problems with some types of solid-state and rotating motor/generators is that the complex waveforms are not properly treated. Even some "real professionals" do not fully understand the problems. There is equipment available that can properly measure input and output power over a wide range of wave forms and frequencies. The next big problem occurs when people use light bulbs to measure energy. The illuminations from light bulbs is highly non-linear and should be used only as a partial indication of energy output or input.

Regards, Hal Fox, Editor, *NEN*

LETTER FROM AN ENGINEER

I am an engineer who has designed a new type of rocket engine. I submitted the invention to the USPTO who then returned a secrecy order to me, with the concurrence of the Air Force. Any advice on my rights?

Thank you for your help.

Dear Engineer,

You should hire a good lawyer to determine what rights you may have under the government secrecy order.

Next time, ask for advice before you file the patent. If no government funds were used in the development of your device, then there are ways to protect your ideas prior to the filing of a patent.

Best regards, Hal Fox, Editor, *NEN*

Meetings

**INE NEW-ENERGY SYMPOSIUM
August 14-15, 1998**

Call For Papers

Deadline for papers July 15, 1998.

Meeting will be held at the University of Utah Union Building on Friday and Saturday, August 14-15, 1998. Cost, if paid by 1 August 1998, is \$100 for members and \$125 for non-members (\$150 at the door).

All papers accepted for presentation will be published in the *Journal of New Energy*. The journal will be available immediately after the conference.

Author's are encouraged to send their abstracts immediately. The editorial staff of the *Journal of New Energy* will select the papers to be presented. Author's will have from 30 minutes to one hour for

their presentation depending on the number of papers that qualify for presentation. If excess papers are offered, new-energy experimental papers will be given preference.

18th International Symposium on Discharges & Electrical Insulation in Vacuum

August 17-21, 1998
Eindhoven, The Netherlands

Hosted by the Eindhoven University of
Technology

Scientific Program, Papers will be presented on all aspects of: Fundamentals of Discharges and Breakdown in Vacuum; Vacuum Discharge Devices and Applications; and Vacuum Insulation Technology and Applications.

Mini-Courses held parallel with conference: Diagnostics for Vacuum Devices, and Production Technology for Vacuum Insulated Devices

A **technical exhibition** will be held featuring components and systems in the area of vacuum discharge devices and vacuum insulated devices (e.g. vacuum switchgear, vacuum deposition and coating, X-ray and microwave tubes and other beam-devices, high-power devices, and equipment for analysis, monitoring and test purposes).

Hotel accommodation in downtown Eindhoven, a short distance from the University Conference Centre, is available through the EUT Conference office at reduced rates.

Information for Authors

Accepted papers will be published in conference proceedings, available at the registration. A limited number of accepted papers will be selected for publication, in a modified and extended version, in Special Issues of *IEEE Transactions on Plasma Science* and *IEEE Transactions on Dielectrics and Electrical Insulation*. The working language of the symposium is English. All printed matter will appear in English.

Correspondence should be sent to:
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Eindhoven Univ. of Technology
P.O. Box 513

5600 MB Eindhoven, The Netherlands

phone: (011)-31-40-247-4849

fax: (011)-31-40-245-8195

E-mail: C.L.A.Schreurs@ieb.tun.nl

Website: <http://www.ele.tue.nl/evt/isdeiv/>

Environmental Needs" 33rd Intersociety Energy Conversion Engineering Conference (IECEC)

August 2-6, 1998 Colorado Springs, CO

Sponsored by the American Nuclear Society, American Inst. of Chemical Engineers, Society of Automotive Engineers, American Inst. of Aeronautics and Astronautics, American Society of Mechanical Engineers, and Inst. of Electrical and Electronics Engineers.

For further information:

ANS Proceedings Office, IECEC '98
555 North Kensington Ave.
La Grange Park, IL 60526

Phone: 708/579-8253; fax 708/352-6464

Web page: www.inspi.ufl.edu/IECEC98

Second International Symposium on Consciousness, New Medicine and New Energy

November 26-27, 1998
Ibuka Hall, Waseda University
Tokyo, Japan

Symposium slogan: Toward New Human Civilization

The Second International Symposium on Consciousness, New Medicine, and New Energy will bring together scientists and scholars from Japan and elsewhere to discuss their pioneering work and raise new questions for further research on the inter-relationship of consciousness, matter and energy, complimentary and integrative medicine, and new energy technologies.

Research in these frontier areas challenges the dominant scientific paradigm, but new scientific world-view and paradigm had appeared at the first symposium. This second symposium will help facilitate this new paradigm, based on wholeness which is important for the future of humanity and the whole earth.

Contact: Mr. Hideo Hirano, symposium secretary at:
Tel/Fax: 0426-65-9371

Commercial Column

The following companies (listed alphabetically) are commercializing cold fusion or other enhanced energy devices: [Listings with your additional copy, or boxed, for small annual service fee.]

COMPANY: PRODUCT

American Pure Fusion Engineering and Supply: Warren Cooley, 1-800-789-7109 or 503-585-6746. Email to: Coolwar@aol.com

Clustron Sciences Corp.: Contact: Ron Brightsen, 703-476-8731.

ENECO: is in the business of commercializing the exciting new field of low energy induced nuclear reactions in solids via patent licensing, joint-ventures, and co-operative research. ENECO, University of Utah Research Park, 391-B Chipeta Way, Salt Lake City, Utah 84108 USA. Contact Fred Jaeger, Voice 801-583-2000, Fax 801-583-6245. Email: jaeger@ENECO-USA.com

E-Quest Sciences: 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 transmutation. We are the publishers for **New Energy News**, and the **Journal of New Energy**. Voice 801-583-6232, Fax 801-583-2963. Contact Hal Fox.

German Association for Vacuum Field Energy: DVS-Secretariat, Feyermuehler Str. 12, D-53894 Merchernich, Germany. Tel: 011-49/(0)2443-8246 Fax: 011-49/(0) 2443-901880 E-mail: dvs@gptec.com Internet: www.gptec.com/dvs.

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.: Rome, Georgia. Contact James Griggs, Voice 706-234-4111 Fax 706-234-0702.

JET Energy Technology, Inc.: Weston, MA. Contact Dr. Mitchell Swartz, Voice 617-237-3625. Fax 617-237-3625.

Labofex, Experimental and Applied Plasma Physics: Ontario, Canada. Contact Dr. Paulo N. Correa. Tel 905-660-1040 Fax 905-738-8427

Magnetic Power Inc.: Sebastopol, CA. Contact Mark Goldes, voice 707-829-9391, Fax 707-829-1002.

Nova Resources Group, Inc.: Denver, CO. Call Chip Ransford, Phone 303-433-5582.

Trenergy, Inc., has acquired rights to develop and produce a new-type of thermal power based on the controlled production of clean nuclear reactions from plasma injected transmutation. Contact through P.O. Box 58639, Salt Lake City, UT 84158-0639, Voice 801-583-6232, Fax 801-583-2963.

UV Enhanced Ultrasound: Hong Kong. FAX 852-2338-3057.

"YUSMAR"- Scientific-Commercial Company: President: Dr. Yuri S. Potapov, 277012 Kishinev, Moldova. Phone and Fax 011-3732-233318.

Zenergy Corp.: Founded in 1996 to facilitate the introduction of commercially viable energy alternatives. 390 South Robins Way, Chandler, AZ 85225. Contact Reed Huish, 602-814-7865, Fax 602-821-0967, e-mail: info@zenergy.com

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

Academy for New Energy (ANE) 216 Commerce Drive, Ste. 4, Fort Collins, CO 80524. Tel. 970-482-3731
ANE Newsletter, quarterly publication of ANE, edited by Robert Emmerich.

Advanced Energy Network Newsletter, quarterly. Advanced Energy Network, P.O. Box 691, Rondebosch 7700 Capetown, Rep. South Africa.

Antigravity News and Space Drive Technology, bimonthly newsletter, pub. J.E.Cox Enterprise, P.O. Box

655, Marietta, GA 30061-655 (Phone 770-218-9693).
Per year \$36. U.S., \$48 foreign.

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

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

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

Electrifying Times, 3/year magazine. 63600 Deschutes
Market Rd, Bend, OR 97701
541-388-1908, Fax 541-388-2750,
E-mail <etimes@teleport.com>
www.teleport.com/~etimes/

Elemental Energy, monthly newsletter, edited by Wayne
Green, 70 Route 202N, Petersborough, NH 03458.
Email: <design37@aol.com>

Fusion Facts has become a section in the *Journal of
New Energy*.

Fusion Technology, Journal of the American Nuclear
Society, edited by Dr. George Miley, 555 N. Kensington
Ave., La Grange Park, IL 60525.

Future Technology Intelligence Report, monthly
newsletter, making available technological information
now omitted from establishment media. Back issues
available at substantially lower cost on the InterNet at
<www.tarapublishing.com> FTIR, P.O. Box 423652,
San Francisco, CA 94142-3652.

Infinite Energy, bi-monthly magazine. P.O. Box 2816,
Concord, NH 03302-2816. Voice: 603-228-4516. Fax:
603-224-5975
E-mail 76570.2270@compuserve.com

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

Visit our **Home Page**: www.padrak.com/ine/ which
contains many important scientific papers and
current reports on all areas of research.

E-mail: halfax@slkc.uswest.net
or ine@padrak.com

Salt Lake City, Utah. Voice 801-583-6232,
Fax 801-583-2963.

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

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

KeelyNet BBS - Jerry Decker, 214-324-3501
Internet: www.keelynet.com
E-mail: jdecker@keelynet.com

Planetary Association for Clean Energy Newsletter,
quarterly, edited by Dr. Andrew Michrowski. 100
Bronson Ave, # 1001, Ottawa, Ontario K1R 6G8,
Canada. Web page: <http://energie.keng.de/~pace>

Positive News and Living Lightly, quarterly, edited by S.
Crockett-Burrows. The Six Bells, Bishops Castle,
Shropshire SY9 5AA UK. Tel: (01588) 630-121 / 122

Space Energy Journal, quarterly, edited by Jim Kettner
& Don Kelly, P.O. Box 1136, Clearwater, FL 34617-
1136.

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

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