

# COLD NUCLEAR FUSION, SPACE ENERGY DEVICES & COMMERCIALIZATION

Hal Fox

Editor-in-Chief, *Fusion Facts*; Editor, *New Energy News*

President, Fusion Information Center, Inc.

P.O. Box 58639, Salt Lake City, UT 84158

## ABSTRACT

After nearly five years of reporting on cold fusion (*Fusion Facts*) and one year editing and publishing *New Energy News* about other enhanced energy devices, a bibliography of over 1500 entries has been compiled from papers gathered and reviewed from over 30 countries. This paper presents a five-year retrospective report on nine different methods by which nuclear reactions are produced and controlled. The emphasis is on demonstrated devices having commercial potential. A similar review is provided concerning a longer history of experiments and devices that are apparently dependent on space energy (an energetic ether) for their operation. Although there exist unexplained experimental reports that are about one century old, this paper examines devices that are currently being developed and replicated. Through the efforts of the **Institute for New Energy**, several candidate enhanced energy devices that appear to have immediate application to solving the world's energy problems have been identified and are discussed. These devices include the dePalma N-machine, the Adams magnetic motor, and the Shoulders' Effect. There are other **unreplicated** devices that appear to have commercial potential within the next few months. All of the devices cited have been reported in either *Fusion Facts*, *New Energy News*, or in both.

## INTRODUCTION

The reward received from collecting, reading, reviewing, and publishing information about enhanced energy devices has been the privilege of becoming friends with a large number of dedicated international scientists and engineers who have risked their scientific reputations to investigate and report on new science. Chief among these scientists are Dr. Martin Fleischmann and Dr. Stanley Pons whose once-in-a-lifetime discovery of cold nuclear fusion has now been replicated in over 30 countries and which is approaching commercialization. Also among new friends are included many scientists from Italy, Japan, China, and from several countries of the Commonwealth of Independent States. Thanks to all of you for your loyalty to science and truth. In addition, my newer friends include scientists and engineers who have risked their reputations by their decades of insistence that space itself, all around us, contains a source of energy that can be and should be used. To those of you who read this paper and this publication, you are especially urged to discard the two major fallacies of yesterday's science: **That there is not an energetic ether and that the Coulomb barrier prevents nuclear reactions in/on a metal lattice.**

## COLD NUCLEAR FUSION DEVICES

A variety of anomalous phenomena have been rediscovered, remembered, or newly discovered since the announcement by Pons and Fleischmann of apparent nuclear reactions from the Pons-Fleischmann Effect (PFE). This section briefly describes eight of those experimental findings, cites the literature, and speculates on the commercial potential of such devices.

## 1. Heavy-Water Electrochemical Cells

The original Pons-Fleischmann discovery involves electrochemical cells using heavy water, a palladium cathode, usually a platinum anode, and lithium in the electrolyte [1]. Many research groups were unable to replicate the Pons-Fleischmann effect and some became instant critics, even to the extent of accusing Pons and Fleischmann of fraud. However, positive results have been obtained by research groups in more than 30 countries in replicating the P-F effect [2]. There has been little cold fusion research among the Ivy-League colleges in eastern U.S. and, except for Italy, only a few cold fusion papers from Western Europe. Several groups in Eastern Europe and Russia have helped to develop a better understanding of the cold fusion technology [3]. However, no group has **fully resolved** the problems associated with the preparation of the palladium metal, the loading of the palladium cathodes, and the "turning on" of the excess heat reactions. See Fig. 1.

A heavy-water cell operated at atmospheric pressure can be expected to produce low-level excess heat, whenever the palladium cathode is loaded with deuterium such that the D/Pd atomic ratio is greater than 0.85 and provided other now well-known protocols are followed. Pressurized heavy-water cells are now being tested that are expected to produce higher levels of heat and lead to commercial applications. The maximum temperature at which pressurized electrochemical cells can operate is in the range of 700°F. At higher temperatures there is no definite demarkation between liquid and gas regardless of the pressure and it is believed that standard electrochemistry would not function above this critical temperature. Therefore, this factor limits the range of commercial applications to industrial and domestic processes requiring temperatures of less than 700°F.

## 2. Light-Water Electrochemical Cells and Nuclear Transmutations

Although the Pons-Fleischmann patent applications anticipated the use of light-water (as an addition to heavy water) in cold-fusion electrochemical cells, and Matsumoto (Japan) measured nuclear byproducts using light water [4], it was Randell Mills (Lancaster, Penn.) who first showed that light-water electrochemical cells using some alkali-metal carbonates could produce excess heat [5]. The Mills theory of the functioning of light-water electrochemical cells is still being carefully evaluated. Drs. Bush and Eagleton (Cal-Poly, Pomona, California) have extended the light-water cold-fusion experimental work and Dr. Bush has modified his Transmission Resonance Model (TRM) to explain both the heavy-water and the light-water results as being alkali-metal-hydrogen fusion [6]. See Fig. 2. More recently Bush and Eagleton have demonstrated that there are definite transmutations of alkali elements by fusion with hydrogen (in the light-water electrochemical experiments) [7] to produce elements with an added proton in the nucleus.

Experimental results from Bush and Eagleton and later several groups at BARC, Trombay, India [8], Dr. Reiko Notoya at Hokkaido University [9], and Drs. Ohmori and Enyo at Hokkaido University [10] have shown that the light-water electrochemical cells are highly reproducible; usually produce 20 to 70% and occasionally up to 300% excess heat; and function with all of the alkali metals (usually as carbonates). The cathodes used are nickel, gold, silver, and tin and range from wire and plate to porous materials (such as the porous nickel used in Nickel-Cadmium batteries.)

There has been some evidence, especially in small-scale light-water electrochemical cells, that excess heat considerably higher than 300% has already been achieved. Therefore, by definition, this technology qualifies for potential commercialization. It is expected that the newer experimental discoveries in light-water electrochemical cells will certainly lead to a better understanding of the **overcoming of the**

**Coulomb barrier, of the basic structure of matter, the control of nuclear reactions in/on a metal lattice, and possibly stabilizing radioactive nuclides.** These are important reasons for accelerating funding for further experimental investigations into both heavy- and light-water cold fusion reactors.

### 3. Molten Salts Electrochemistry

Drs. Liaw and Liebert of the University of Hawaii invented and demonstrated the use of molten salts to provide relatively high temperatures in an electrochemical cold-fusion cell [11]. Their work showed that as much as 1500% excess heat could be achieved using palladium as the anode and using an eutectic mixture of salts in an aluminum container. See Fig. 3. It has been found that there are some serious materials problems to be resolved in working at these higher temperatures. The replication of this work has been difficult. Only a few other groups have replicated the Liaw-Liebert molten salt work [12]. However these problems are expected to be resolved and the molten salts "cold fusion" devices become an important part of future enhanced energy systems. The high level of heat achieved does mark this technology as eligible for commercialization after the materials problems are solved. The applications for molten-salts cold-fusion devices are obviously destined for systems where higher temperatures are desired or required, such as in the manufacturing and/or processing of many glasses and metals. Recently, Liaw has reported some successes with the use of a nickel cathode in a molten salt reactor [13].

### 4. Gas Plasma Devices

One U.S. inventor (John Marshall of Surface Solutions in Boulder, Colorado) has filed a patent for a gas-plasma device which is expected to produce excess heat. Some excellent work using gas-plasma devices has also been performed in Russia by Drs. Kucherov, Karabut, and Savvatimova [14]. Other gas plasma replication has been accomplished by Romodanov in Russia [15] and by scientists in the People's Republic of China [16]. This Kucherov et al. device uses deuterium gas at relatively low pressures and in the presence of moderately-high voltages (about 500 volts). See Fig. 4. The cathode is palladium. A variety of nuclear reactions have been identified in the glow-discharge, gas-plasma devices.

It is projected that the development of this gas-plasma device will produce enhanced-energy systems that operate at high temperatures and in aerospace environments. (Neither heavy-water nor light-water electrochemical cells are deemed suitable for either high-temperature or aerospace use.) The best results that have been achieved with gas-plasma devices (over 500% excess heat) appears to make this type of cold fusion device a candidate for future commercialization.

### 5. Capillary Fusion

Some types of metal crystals can be made in which small diameter, long tubes or capillaries are created. Under appropriate conditions it has been experimentally shown that fusion of hydrogen can be achieved in this type of device. See Fig. 5. Dr. Graneau [17] has described unusual longitudinal electrical forces in wires, and Dr. Vigier [18] has described the observation of capillary cold fusion in metal wires using high amperage. After initial successes, work is being continued by Baraboshkin and Samgin in Russia to investigate this approach to the development of excess heat [19]. The Vigier article and other articles about the role of Ampère forces in nuclear fusion [20] suggest that devices using the right combination of capillaries, hydrogen (or deuterium) gas and appropriate treatment with high-amperage electrical current may develop sufficient excess heat to be subject to commercialization. Recently, Peter Graneau [21] presented a concept for a capillary fusion reactor. Graneau believes that it will take some expert materials engineering to produce this type of reactor because of the relatively large internal forces that are expected

to be produced. However, Graneau's approach is a serious proposal for a device that would lead to commercialization of capillary fusion.

## 6. The Yamaguchi Pd sandwich.

Eiichi Yamaguchi and Takahashi Nishioka [22] have shown that palladium plates that are gold-plated on one side (to prevent migration of deuterium) and plated with MnO on the opposite side (to slow down rate of deuterium diffusion) can produce nuclear reactions. The plates, see Fig. 6, are exposed first to a vacuum then to deuterium gas. Being again exposed to vacuum and triggered with an electrical pulse, tritium, neutrons, and alpha particles ( $^4\text{He}$  nuclei) are produced together with considerable heat. As Yamaguchi and Nishioka reported in the third annual cold fusion conference, "We have for the first time succeeded in detecting  $^4\text{He}$  production *in situ* and with high reproducibility. Our *in vacuo* method gives the first definite evidence for the reality of **cold nuclear fusion** in solids."

This work has been of great importance to demonstrate the rich phenomena involved in the production of nuclear reactions in or on the surface of a metal lattice. It is not easy to predict the degree of commercialization that can be achieved by use of the Pd sandwiches, however, the reproducibility is important for studying the parameters that are involved with the production of nuclear byproducts. Because of the production of neutrons, this device may find applications where a neutron flux is desired.

## 7. Proton Conductors

Two very important papers were presented at the Hawaiian ICCF-4 about the use of proton conductors in the investigation of cold fusion. The paper by Samgin et al. [23] describes the types of solid-state materials that show promise for the production and control of nuclear reactions. The paper by Mizuno et al. [24] details an experiment in which a small layered proton conductor provided excess power over a 20-hour time period in which the excess heat exceeded several thousand times the input power.

## 8. Sparking Devices

Dr. J. Dufour [25], working in France, has designed, tested, proven, and reported on a technique by which electrical discharges are used to create nuclear reactions. The object of the work was to obtain excess energy of a significant amount over a significant time period and then to identify nuclear byproducts. Dufour's conclusions includes the following: A fully-reproducible and stable system has been designed and tested; excess heat is achieved over long time periods; and a possible explanation is an hypothetical class of nuclear reactions based on virtual neutron transfer.

## 9. New nickel phenomena

A recent (February, 1994) report from three Italian scientists (F. Piantelli from Siena, S. Focardi from Bologna, and R. Habel from Cagliari) describes the use of a nickel electrode producing 40 watts of excess heat. This new discovery used a nickel bar (1 sq. cm. in cross section and 9 cm. long) in a hydrogen atmosphere and heated to about 350 degrees C. After a proprietary electromagnetic stimulation, the system generated about 40 watts of excess heat. The results are reported to be highly reproducible.

## Summary

These are exciting times in the study of the new science of cold fusion. Every conference reports on new

experimental findings that serve to advance the understanding of the phenomena of the catalysis of nuclear reactions in/on a metal lattice. It can now be reasonably predicted that there will be a number of commercial applications derived from the rich phenomena that has been discovered in cold nuclear fusion.

## ROTATING DEVICES THAT CONVERT SPACE ENERGY

### 1. Introduction

There are a variety of experiments that can be more easily understood if the existence of an energetic ether is acknowledged. No one should depend on the misinterpretation of the Michelson-Morley experiment as proof of the non-existence of an energetic ether. A 15-year-old young man has provided a didactic paper showing that the Michelson-Morley experiment **could not measure the effect for which the experiment was designed** [26]. Michelson, himself, was not convinced of the truth of his **null experiment**. Later he and Gale set up a 2 million sq. ft. interference loop in Illinois in the winter of 1923-24 to measure changes in the speed of light and obtained different results. See Hayden et al., "If Michelson-Morley, Why not Sagnac and Michelson-Gale?", (*Galilean Electrodynamics*, vol 1, **1990**). It is claimed that Einstein's theory of relativity is based on the mistaken interpretation of the Michelson-Morley experiment so that the mathematical development was constrained by not allowing the existence of an energetic ether. The following are a few of the experiments that can best be understood if one accepts the existence of space energy:

a. Electrical induction (Faraday): When a conductor is moved through a volume of space in which a magnetic field is present, current flow is induced in the conductor. Note that this statement says nothing about "cutting lines of force."

b. Magnetic Field (Faraday): When a direct current flows in a coil a magnetic field appears in the center of the coil and the orientation of the magnetic polarity can be determined if the direction of the current is known.

c. Magnetic Materials (Faraday): Some atomic and/or molecular structures can sustain temporarily or exhibit permanently, strong magnetic fields, especially when such a magnetic material is placed within an electric coil in which current is flowing.

d. Levitation with Conducting Sphere (George S. Piggot, 1904, as reported by William F. Hamilton): When a conducting spherical electrode is rotated and high-voltage electricity is applied, it was shown that small metal balls, cork, and wood could be supported against gravity.

e. Gravity & High Voltage (Dr. Francis Nipher, St. Louis, Missouri, 1916-17): When a mass is connected to high-voltage, gravitational attraction was affected.

f. Gravity & Gyroscope (dePalma): When a spinning gyroscope falls along its axis of rotation, the rate of fall in an earth's gravity field is slowed.

g. Gravity & Magnets/Coils (Kelly, 1993-4): When non-inductive coils are wound around magnets, and the coils are energized, then the rate of fall is decreased. [On May 15, 1994, Kelly demonstrated this phenomena to about 100 people attending the 1994 International Symposium on New Energy, Denver, CO. See Proceedings.]

- h. N-Machines (dePalma, Tewari, Inomata): When layers of magnets and conductors are rotated, electricity is produced (as in an N-machine.) This is a specific embodiment of example **a**.
- i. N-Machine & Back Torque (Tewari, Inomata): When an N-machine is operated in a no-load condition, the input torque is measured. When the N-machine output is switched to a full-load condition, the input torque is not directly proportional to the load. This is a dramatic difference between N-machines and classical electric motors/generators. See also examples **a and h**.
- j. Force by High Voltage (T. Townsend Brown): When high-voltage is applied to an air foil, mechanical forces are produced.
- k. Energy Stored in Magnetic Field (Aspden, 1993): Under certain conditions, magnets can store energy in space and that energy can be recaptured and used. This is believed to be the phenomena used in the Adams magnetic motor.
- l. Electron Charge Clusters (Shoulders, 1985): When a high-density electron charge cluster is produced it travels at about 0.1 the speed of light in the electric field between cathode and anode. Under certain conditions, more energy can be extracted from the moving high-density charge cluster than required to produce the charge cluster. This is the Shoulders' Effect as shown in U.S. Patent 5,018,180.
- m. Electric Generator & Levitation (Searl 1970): When magnetic forces are produced at right angles in the presence of rotary motion, high voltage electricity is generated, the temperature is reduced, and gravity is reduced. This effect is reported to have been demonstrated by the Searl "levitating disks".
- n. Space Energy is not Isotropic (Christian Monstein, Freienbach, Switzerland, 1993-4): When rotating a cylindrical magnet on its axis the time for slowing down is different depending on the direction of rotation. Note: This may be an effect of interaction with earth's magnetic field. Marinov (in his book [Divine Electromagnetism](#)) describes experiments that definitely show that space energy is not the same in every direction.
- o. Electric Generator, Cermet (Lambertson, 1993-4): When electric current flows in "an accelerated fashion" in ceramic-metal semiconductor devices (cermets), a circulating current can be produced that provides excess energy to a tank circuit.

There are many other examples of patented "over-unity" machines that appear to depend on an energetic ether for the machines to operate as claimed. However, the above examples should be sufficient to indicate that there is at least a 75-year history of experimental evidence for space energy. The following describes a few of these devices that have been replicated and where the development of the machine or system is still being pursued.

## **2. The N-Machines**

This author has not, as yet, mastered the three-decade history of the development of rotating machines that produce excess power (also known as over-unity machines). The basic device is the homo-polar electrical generator discovered by Michael Faraday in December, 1831. (We have replicated Faraday's homo-polar generator in our laboratory). Bruce DePalma is one of the proponents and successful experimenters with machines that appear to obtain excess power by using magnets and conductors rotating together on a shaft (often driven by an electric motor.) These electrical generating machines are characterized by the

following: (1) the demonstrated ability to produce more electrical power than used to rotate the machines; (2) an electrical output of low voltage but high current; (3) power produced without **cutting lines of force**; (4) the dynamic characteristic that requires relatively high rotational speeds to produce over-unity power; (5) the apparent lack of increasing counter-torque on the generator shaft as high output is achieved, and (6) the requirement for relatively high magnetic field strengths [27, 28, 29].

Recent articles by Bruce dePalma [27] have been published in *New Energy News*. During the past decade (or more) P. Tewari has developed N-machines with the current experimental work being documented in both printed [28] and video media. This report and video presentations depict a machine driven by an electrical motor that is capable of rotating the generator at more than 4,000 rpm while consuming up to about one-kilowatt of input electrical power from the standard electrical mains in India. See Fig. 7. As is shown and described, the generator has produced more output power than is being consumed by the driving motor. The output voltage is less than three volts but with high amperage. The demonstrated over-unity condition is achieved at rotational speeds of about 3,000 to 4,000 rpm.

Shiuji Inomata of the Electrotechnical Laboratory in Ibaraki, Japan has developed and tested a smaller motor/generator which has been shown to produce over-unity power output at high rotational speeds [29]. Recently, Inomata provided *New Energy News* with his latest design which will use superconducting magnets to increase the magnetic field strength [30]. Inomata has derived an equation for the voltage output of the machine showing that the output voltage is directly proportional to rpm and to magnetic strength and proportional to the square of the radius of the rotating copper disks used in his machine. His calculations, based on experimental evidence with the current model (see drawing, Fig. 8) indicates by using superconducting coils to increase the magnetic force, that the output can be increased to provide 10 kW and more from a machine using a 25 cm diameter copper disk.

The biggest disadvantage of the N-machines is their low-voltage output (in the range of 1 to 40 volts). However, the output current can be in thousands of ampères. This combination, together with the requirement that the d.c. output must be taken off a rotating disk, places substantial demands on the development of the electrically-conducting brushes. The second problem is to transform the low-voltage, high-current output into more acceptable electrical power. Both problems have been potentially resolved by modern engineering developments. The use of hundreds of hair-like conducting-metal fibers for the brushes and the use of modern solid-state devices for transforming low-voltage d.c. into high-voltage a.c. are the proposed solutions.

Tewari's goal is to produce a motor-generator plus transforming circuitry so that the generated power can be used to drive the electrical motor and still have excess power delivered to the output load. This demonstration will be, of course, the final proof that such a machine is transferring power from a heretofore unused energy source. That source is "space energy" or ZPE (zero-point energy). We await such demonstration with keen interest.

### 3. The Adams Magnetic Motor

The Adams magnetic motor (See Fig. 9) has had considerable recent publicity but no peer-reviewed articles have been published. Adams is an inventor without the standard Ph.D. qualifications to be called "scientist". He has made claims for significant over-unity power production. Recent verbal and video reports have been made concerning the replication of the Adams machine. Dr. Harold Aspden has joined forces with Adams for further development of this type of magnetic motor. Dr. Aspden, who has long been an advocate of the existence of an energetic **aether**, has filed for a patent on a similar magnetic

machine [31]. The most interesting report on the Adams Magnetic Motor is that (when properly "tuned") it appears to charge the battery that operates the motor.

## **SOLID-STATE SPACE-ENERGY DEVICES**

### **1. The high-density electron charge clusters.**

Dr. Harold Puthoff is one of the scientists who have written extensively about space energy [32, 33]. He and Kenneth Shoulders have been working in this new field of science for several years. The discovery by Kenneth Shoulders [34] that high-density electron clusters can be produced, maintained, and controlled has laid the groundwork for a new revolution in electronic devices. Of most importance for this paper is Shoulders' demonstration (as reported in the patent discussion [34], prior to the claims) that under certain conditions an EV (Shoulders' name for high-density electron clusters) can produce more than 30 times the amount of energy required to produce the EV. The drawing in Fig. 10 is taken from the patent abstract and illustrates how the EVs are created and how power is obtained. Basically, the EV is produced and launched through a tube or channel which is surrounded by a wire coil. The EV is a traveling bundle of electrons, moves at about 0.1 the speed of light, and induces a surge of electrical power in the coil. The EV is captured by the anode and provides about the same amount of energy that was required to produce the EV. The power from the coil has been measured to be more than 30 times the power required to produce the EV. (In discussions with Shoulders, he reported great difficulties in producing continuous excess power due to induced electrostatic charges caused by the energetic EVs.) Shoulders' latest innovation is expected to overcome the problems and provide for a commercial product.

In the discussion given in the patent, the statement is made (and accepted by the patent examiner) that the source of power "appears to be the zero-point radiation of the vacuum continuum." **It is believed that this is the first U.S. patent that has been granted which claims to tap the energy of space.** The important aspect of the production and use of EVs is that the charge density (in terms of charge per cubic centimeter) is extraordinarily high, perhaps similar to ball lightning or within lightning strokes. It appears that the highly-dynamic nature of the EV actually does tap the energy of space and that a traveling EV is continually giving off energy and having its internal energy restored. There will obviously be an increasing interest in creating, launching, and studying the methods by which the energy of the EV can be coupled to provide useful work.

### **2. The Lambertson cermet device.**

Dr. Wingate Lambertson has invented a device which uses a cermet (ceramic-metal) type of semi-conductor. Under proper conditions, the electrons are accelerated in such a manner that useful excess power can be extracted and delivered to an outside load. Dr. Lambertson describes this device in a March, 1994 article published in *New Energy News* [35]. See Fig. 11.

## **SUMMARY AND PREDICTIONS**

Since March 23, 1989, when Drs. Pons and Fleischmann were directed to make a public announcement of their discovery of cold fusion, the world has changed. As has previously happened with new scientific discoveries, many confirmed skeptics have treated cold fusion with emotional reactions ranging from disdain through false claims of fraud. Serious scientists, especially those who were aware of the reputations of the inventors, have not only replicated the original Pons-Fleischmann work but have also added seven (and growing) new methods by which nuclear reactions (or, at least, excess heat) can be



produced and controlled in a variety of devices.

In an amazing demonstration of near-synchronicity, the recognition of and the commercialization of tapping space energy has emerged from its doldrums and is being recognized for its scientific merit. Now we have several serious concurrent developments of devices and systems that appear to obtain energy from the environment (space) around us. The N-machine, magnetic motors, and some solid-state devices are being developed to help resolve the world's energy problems.

In both cases, of cold fusion and space energy devices, there are corporate efforts involved in the commercialization of new energy devices. Particularly in Japan, there is both academic and corporate development work with the goal of solving the world's energy crisis. In India, there are strong efforts to develop new energy sources, especially at the Bhabha Atomic Research Centre near Bombay. Additional efforts are being made in many other countries, most notably in Russia, China, Taiwan, Italy, Spain, and in the United States. More modest scientific efforts are being pursued in many other nations such as Argentina, Romania, Hungary, and France. The oil-rich nations and the highly industrialized western nations have appeared more reluctant to pursue developments in either cold fusion or in space energy. However, companies such as ENECO, Inc. and Fusion Information Center (both of Salt Lake City, UT); HydroCatalysis Power Corporation (Lancaster, PA); and the Electrical Power Research Institute (Palo Alto, CA) have assets, funds, and personnel working on the development and commercialization of new energy systems.

Japan through its MITI organization plus several major corporations, such as IMRA and Toyota, have committed major funding. It is Japanese funds that have built a new \$6 million laboratory for Drs. Pons and Fleischmann near Nice, France where significant progress is being made toward the commercialization of cold fusion.

One of the major developments in the U.S. is the financial assistance of Lynda and Bill Beierwaltes to fund the first and second International Symposia on New Energy. These conferences, plus the activities of the Institute for New Energy (founded in May 1993) are making a dramatic difference in the world's renewed interest in tapping the energy of space.

Therefore, the following is predicted:

1. There will be a continued effort to commercialize both cold fusion and other new energy systems.
2. As soon as successful demonstrations of commercial prototypes are made there will be a strongly accelerated, world-wide interest in developing, manufacturing, and distributing new energy devices and systems.
3. Drs. Fleischmann and Pons will be nominated to receive a Nobel prize.
4. The largest investment and the most new energy products will be made in Japan.
5. The nuclear fission power industry will cease to expand.
6. Finally, the U.S. Department of Energy will officially admit the reality of cold fusion and new energy devices and point with pride to the activities of their own national laboratories in the development of cold fusion.

## REFERENCES

- [1] Martin Fleischmann, Stanley Pons, and M. Hawkins, "Electrochemically Induced Nuclear Fusion of Deuterium," *J. Electroanal. Chem.*, 1989, vol 261, pp 301-308, and erratum, vol 263, p 187.
- [2] Hal Fox, Cold Fusion Impact in the Enhanced Energy Age, published by Fusion Information Center: Salt Lake City, UT, 1993, see the included bibliography diskette, also available in Russian and Spanish.
- [3] Vladimir Tsarev (Lebedev Physical Inst.), "Cold Fusion Researches in Russia," in Frontiers of Cold Fusion, Proceedings of the Third International Conference on Cold Fusion, H. Ikegami, Ed., pp 341-351, 30 refs, c1993, Universal Academy Press, Tokyo.
- [4] T. Matsumoto, "Cold Fusion Observed with Ordinary Water," *Fusion Technology*, May 1990, vol 17, no 3, pp 490-492, 3 figs, 4 refs.
- [5] Randell L. Mills and Steven P. Kneizys, "Excess Heat Production by the Electrolysis of an Aqueous Potassium Carbonate Electrolyte and the Implications for Cold Fusion", *Fusion Technology*, vol 20, Aug 1991, pp 65-81, 10 refs, 9 figs, 2 tables.
- [6] Robert T. Bush, "Cold Fusion with Light Water," *Fusion Facts*, December 1991, p 1-2. See also Robert T. Bush, "A Light Water Excess Heat Reaction Suggests that 'Cold Fusion' may be 'Alkali-Hydrogen Fusion'," *Fusion Technology*, vol 22, Sept 1992, pp 301-322, 61 refs, 2 figs.
- [7] Robert T. Bush (Cal Poly, Pomona, California), "Towards a Solid State Nuclear Physics: The LANT Model (Lattice-Assisted Nuclear Transmutation) for Cold Nucleosynthesis," *Fusion Technology*, 1993, accepted for publication. See also Peter Glück, "Nuclear Catalysis & Cold Fusion - The SURFDYN Model," *Fusion Facts*, June 1992, pp 1-3, also *Fusion Technology*, vol 24, no 2, pp 122-126, 44 refs.
- [8] M. Srinivasan, A. Shyam, T.K. Shankarnarayanan, M.B. Bajpai, H. Ramamurthy, U.K. Mukherjee, M.S. Krishnan, M.G. Nayar and Y. Naik (Bhabha Atomic Research Centre, Bombay, India), "Tritium and Excess Heat Generation During Electrolysis of Aqueous Solutions of Alkali Salts with Nickel Cathode," Frontiers of Cold Fusion, Ed. by H. Ikegami, Proceedings of the Third International Conference on Cold Fusion, October 21-25, 1992, Universal Academy Press, Tokyo, pp 123-138, 8 figs, 3 tables, 9 refs.
- [9] Reiko Notoya (Hokkaido Univ.), "Cold Fusion by Electrolysis in a Light Water - Potassium Carbonate Solution with a Nickel Electrode," *Fusion Technology*, vol 24, no 2, Sept 93, 4 figs, 5 refs.
- [10] Tadayoshi Ohmori & Michio Enyo (Hokkaido University, Catalysis Research Ctr., Kitaku, Sapporo), "Excess Heat Evolution During Electrolysis of H<sub>2</sub>O with Nickel, Gold, Silver, and Tin Cathodes," *Fusion Technology*, vol 24, no 3, pp 293-295, 9 refs, 2 figs, 4 tables.
- [11] Bor Yann Liaw, Peng-Long Tao, and Bruce E. Liebert\* (Hawaii Natural Energy Institute, and \*Department of Mechanical Engineering, University of Hawaii), "Recent Progress on Cold Fusion Research Using Molten Salt Techniques," The Science of Cold Fusion, Ed by Bressani, Del Giudice & Preparata, c 1991, Società Italiana di Fisica, Bologna, Italy, pp 55-64, 11 figs, 2 tables, 17 refs.
- [12] L.J. Yuan, C.W. Wan, C.Y. Liang and K.S. Chen (National Tsing Hua Univ.), "Neutron Monitoring

on Cold Fusion Experiments," in Frontiers of Cold Fusion, Proceedings of the Third International Conference on Cold Fusion, H. Ikegami, Ed., pp 461-464, 5 figs, 2 refs, c1993, Universal Academy Press, Tokyo.

[13] Bor Yann Liaw, "Some Thermodynamic Aspects Related to Charging Hydrogen Species into Metal Lattice," presented at the Fourth International Conference on Cold Fusion, Maui, Hawaii, December 6-9, 1994.

[14] A.B. Karabut, Ya. R. Kucherov and I.B. Savvatimova, "Nuclear Product Ratio for Glow Discharge in Deuterium," *Phys. Lett. A*, 1992, vol 170, pp 265-272.

[15] Romodanov, Savin, Skuratnik, & Elksnin, "Reproducibility of Tritium Generation from Nuclear Reactions in Condensed Media," paper presented at the Fourth International Conference on Cold Fusion, Hawaii, Dec. 9, 1993.

[16] Xing Zhong Li (Tsinghua Univ. Beijing, China), Personal communication.

[17] Peter Graneau, "First Indication of Ampère Tension in Solid Electric Conductors," *Physics Letters*, vol 97A, no 6, 5 Sept 1983, pp 253-255, 6 refs, 1 fig.

[18] Jean-Pierre Vigier (Univ. P. and M. Curie, Paris), "New Hydrogen Energies in Specially Structured Dense Media: Capillary Chemistry and Capillary Fusion," Preprint courtesy of the author, to be published in *Phys. Lett. A*.

[19] K.A. Kaliev, A.N. Baraboshkin, A.L. Samgin, "Reproducible Nuclear Reactions During Interaction of Deuterium with Oxide Tungsten Bronze," *Phys. Lett. A*, 1993, vol 172, p 199.

[20] Peter Graneau (Center for Electromagnetic Research, Northeastern Univ. Boston, MA), "The Role of Ampère Forces in Nuclear Fusion," *Physics Letters A*, vol 165, 1992, pp 1-13, 10 figs, 29 refs.

[21] Peter Graneau, "Concept of a Capillary Fusion Reactor," in *Proceedings of the International Symposium on New Energy*, April 16-18, 1993, Denver, Colorado, pp 153-168, 2 figs, 11 refs.

[22] Eiichi Yamaguchi & Takahashi Nishioka, "Direct Evidence for Nuclear Fusion Reactions in Deuterated Palladium," in Frontiers of Cold Fusion, Proceedings of the Third International Conference on Cold Fusion, pp 179-188, 5 figs, 12 refs.

[23] A.L. Samgin, A.N. Baraboshkin, I.V. Murigin, S.A. Tsvetkov, V.S. Andreev, G. Varkarin (Inst. of High-Temp. Electrochemistry, Russian Acad. of Science, Ekaterinburg), "The Influence of Conductivity on the Neutron Generation Process in Proton Conducting Solid Electrolytes," presented at the Fourth International Conference on Cold Fusion, Maui, Hawaii, December, 1993. To appear in the Proceedings.

[24] Tadahiko Mizuno, Michio Enyo, Tadashi Akimoto & Kazuhisa Azumi (Hokkaido Univ., Sapporo, Japan), "Proton Conductors during Absorption/Desorption of Deuterium in Alternate Electric Field," presented at the Fourth International Conference on Cold Fusion, Maui, Hawaii, December, 1993. To appear in the Proceedings.

[25] J. Dufour, "Cold Fusion by Sparking in Hydrogen Isotopes," *Fusion Technology*, **1993**, vol 24, p

- [26] Stefan Marinov (writing about Fritzchen Zungezeige), "Once More on the Herd of the Blind," *Deutsche Physik*, **April-June 1994**, vol 3, no 10, pp 30-34.
- [27] Bruce DePalma, "Where Electrical Science Went Wrong," *New Energy News*, vol. 1, no. 5, Sept. 1993, pp 1-4, 5 figs, 3 refs. Also, "On the Nature of Electrical Induction", *New Energy News*, vol 1, no 6, pp 2-8, 5 figs, 14 refs.
- [28] Paramahansa Tewari, "Generation of Cosmic Energy and Matter from Absolute Space (Vacuum)," *Proceedings of International Symposium on New Energy*, Maury Albertson, Ed., Denver, Colorado, April 16-18, 1993, pp 291-303, 6 figs, 8 refs.
- [29] Shiuji Inomata & Yoshiyuki Mita, "Small Neodymium Magnet Twin N-Machine," *Proceedings of 28th Intersociety Energy Conversion Engineering Conference*, August 8-13, 1993, Atlanta, Georgia, pp 2.347-2.352, 11 figs, 2 refs.
- [30] Shiuji Inomata, "Letter from Shiuji Inomata with Conceptual Design of JPI-II Test Machine," *New Energy News*, vol 1, no 7, pp 7-8, 2 tables, 3 figs.
- [31] Harold Aspden, "Open Letter from Harold Aspden," *New Energy News*, vol 1, no. 10, pp 13-14, 1 ref.
- [32] Harold E. Puthoff, "The Energetic Vacuum: Implications for Energy Research," *Speculations in Science & Technology*, 1990, vol 13, no 4, pp 247-257, 33 refs.
- [33] Hal Fox, "Space Energy - Peer Reviewed," *New Energy News*, Feb 1994, vol 1, no 10, pp 2-6, 8 refs.
- [34] Kenneth R. Shoulders, "Energy Conversion Using High Charge Density," U.S. Patent 5,018,180, May 21, 1991, 80 pages, 97 figs, 42 claims.
- [35] Win Lambertson, "Electric Power from Space Energy," *New Energy News*, March, 1994, vol 1, no 11, pp 1-4, 4 figs.