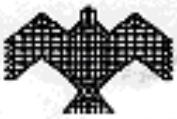


NIAS

One-Day Discussion meeting on

"Emerging New Energy Concepts for the 21st Century : Low Energy Nuclear Reactions"

Wednesday, 9th January, 2008

JRD TATA AUDITORIUM
NATIONAL INSTITUTE OF ADVANCED STUDIES
Bangalore 560 012

Sponsored by : Board for Research in Nuclear Sciences.

BACKGROUND NOTE

Ever since the two electrochemists Martin Fleischmann and Stanley Pons of the University of Utah announced in March 1989 that they had discovered a simple fable top device wherein nuclear reactions take place at room temperatures producing significant "excess heat", the subject of what came to be known initially as "Cold Fusion" but now more commonly referred to as "Low Energy Nuclear Reactions" (LENR), has been embroiled in controversy. The majority of the scientific community had dismissed the claims as unlikely. The main criticisms were (a) Non reproducibility of the phenomenon (b) Non observation of tell-tale signatures of the occurrence of nuclear reactions in the form of nuclear radiation or particles and (c) most importantly, there did not seem to be any valid explanation or theory as to how the coulomb barrier can be overcome in these experimental configurations for nuclear fusion reactions to happen at low temperatures.

While the majority of the groups world wide who attempted to replicate the original experiments in the first few years failed, a few persisted and continued with the work. With patience and over time, this, minority has been reporting anomalous "excess heat" not attributable to faulty calorimetry or any hidden chemical reactions. Other groups through careful experimentation have reported the observation of nuclear reactions and/or accompanying emanations such as neutrons, tritium, helium, charged particles etc. Over the last 19 years the sophistication of the experiments has significantly improved and considerable evidence has accumulated indicating the occurrence of nuclear transmutation reactions in these devices. A large variety of experimental configurations have been studied, besides electrolytic cells. However reproducibility is still a problem although there are now a few recipes which are claimed to give a reasonable degree of reproducibility.

As for the fundamental objection of the nuclear physics community regarding overcoming the coulomb barrier at low temperature, it would seem that inside a solid, such as a metal, the physics of nuclear reactions is very different from the physics in a plasma

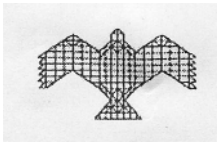
During the last 19 years, 13 International conferences in the ICCF series have taken place as well as several meetings at the national level. Most of the papers published to date are available on the Web . A professional society named "International Society for Condensed Matter Nuclear Science" (ISCMNS) was formed in 2002 which publishes an electronic journal of CMNS. There is still reluctance on the part of some mainstream physics and chemistry journals to publish papers pertaining to this field but a few prestigious journals have started publishing these papers. It is noteworthy that both the American Physical Society and American Chemical Society have been convening special sessions on the topic of LENR in the last few years during their annual meetings.

It thus appears that the field of LENR/CMNS has matured sufficiently to claim recognition as a valid new branch of science, even though many of the questions raised in the early years still remain. If all that is claimed by the LENR community is validated then one has to assume that we are witnessing a significant paradigm shift in nuclear science. It is therefore felt that the time is ripe for the Indian Scientific community to take stock of the status of the field with an open mind, in view of its potential importance and the prospects of being developed into a practical energy generating source for the 21st century.

In this one-day meeting, three researchers and one editor who have been closely associated with the field will share their first-hand experience in this emergent area of science and lead the discussions.

Dr. M. Srinivasan
Chennai

Prof. B.V. Sreekantan
NIAS, Bangalore



One-day Discussion Meeting On

"EMERGING NEW ENERGY CONCEPTS FOR THE 21ST CENTURY

LOW ENERGY NUCLEAR REACTIONS"

Wednesday 9th January 2008

JRD Tata Auditorium
National Institute of Advanced Studies

Bangalore 560012
PROGRAMME

09.30 hrs: Dr. Kasturirangan: Welcome Remarks

09.40 hrs: Dr. M. Srinivasan: Introduction and Scope of Workshop

09.50 hrs: Dr. Michael McKubre
"Low Energy Nuclear Reactions: Past, Present and Future - A Review of the Understanding Developed Over 19 years of Research"

10.40 hrs: Tea Break

11.00 hrs: Mr. Steven Krivit
"Low Energy Nuclear Reactions Research - Global Scenario"

11 45 hrs: Dr. M. Srinivasan:
"Low Energy Nuclear Transmutations in the Pre-Fleischmann Era"

12. 35 hrs: Lunch Break

14.00 hrs: Panel Discussion: "The Way Forward"

15.00 hrs: Prof. B. V. Sreekantan: Closing remarks

15.15 hrs: End of Main program

15.20 hrs: Dr. Edmund Storms: Video specially recorded for this meeting: "How to Cause Nuclear Reactions at Low Energy and Why Should You Care?"

16.15 hrs: End of Program for day

Low Energy Nuclear Reactions: Past, Present and Future - A Review of the Understanding Developed over 19 years of Research

Michael C.H. McKubre
Director, Energy Research Center
Materials Research Laboratory, Physical Sciences Division
SRI International, Menlo Park, CA, USA

ABSTRACT

The public announcement on March 23rd 1989 by Professors Fleischmann and Pons of the discovery of nuclear-level heat effects in palladium deuteride came as a surprise to most Essentially everybody who had the means to do so, diverted their attention to theoretical and practical considerations of replication. Their near universal purpose was to be among the first few to reproduce, in some cases real, in some cases hypothetical or mistaken aspects of the "Fleischmann-Pons" or "FP" effect.

The dilemma all were confronted with immediately was; what conditions were necessary and sufficient to produce the heat effect? The history of palladium deuteride research was sufficiently rich to be certain that anomalous effects were either subtle or not present under ordinary conditions. If the needed (and as yet unstated) conditions were extraordinary, then few if any groups could approach the technical competence and experience of the Fleischmann-Pons team. In this light the failures that resulted might have been predicted but how might this failure of process have been avoided?

We propose, one possible set of questions as a process to be examined sequentially to a logical conclusion:

Q1: Is there unexplained heat output from the FP effect?

Q2: Is the heat output sensibly correlated with inputs?

Q3 : Are nuclear processes associated with the effect?

Q4: Is nuclear ash correlated with the excess heat?

Q5 : Are there other nuclear effect?

Q6: What is the nuclear process?

Q7: What is the future?

This paper discusses retrospectively the evolution of our understanding of the Fleischmann-Pons effect as answers to the set of questions Q1 to Q5 affirmatively and with experimental detail and questions Q6 and Q7 more speculatively.

Low Energy Nuclear Reactions Research - Global Scenario

Steven Krivit
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ABSTRACT

A science journalist's view of the field of low energy nuclear reactions, historically known as "cold fusion" is presented. The author has investigated innumerable aspects of this controversial subject, its strengths, weaknesses, proponents and opponents. He has studied the past; from the very beginnings of the field when it first was discovered experimentally by Martin Fleischmann and Stanley Pons at the University of Utah.

The author will briefly explain his introduction to the field and why he decided to follow it. He will briefly discuss a few examples of why the field suffered disrepute; some of it deserved, most of it not The author has looked more deeply into the facts of LENR than any other journalist in the last decade. With facts given to him from the proponents of the field, he has approached the most outspoken opponents of the field to seek balanced and objective viewpoints.

Topics to be touched upon in this talk are:

* The matters of repeatability and reproducibility
* Fusion-based theories and their struggle for recognition
* A non-fusion-based theory
* The possibility of hydrogen as a fuel instead of deuterium
* The possibility of nickel as a host metal instead of palladium
* The anomaly of low energy nuclear transmutations

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Low Energy Nuclear Transmutations in the Pre - Fleischmann Era

Mahadeva Srinivasan
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ABSTRACT

The renowned 17th century chemist Lavosier, often considered as the "father of Chemistry", was among the first to declare the non-transmutability of "simple bodies" (as elements were referred to by him) and propound the dogma of the "invariability of elements". It is a commonly accepted and basic tenet of science that all the 92 elements in nature have been present on earth since the time of its formation from out of star dust and no ordinary chemical or physical process can transmute one element into another (except during radioactive decay or bombardment by high energy nuclear particles etc.)

Yet there have been persistent claims and reports down the ages that elemental transmutation processes can and do occur starting with the ancient "infamous" claims of Alchemy, namely the conversion of mercury to gold! Since the 18th century there have been sporadic experimental reports pointing to the possible occurrence of elemental transmutation reactions in nature, especially in plants and animals as documented in the book "Biological Transmutations" published in the 60s by Louis Kervran. Kervran's followers such as Michio Kushi, George Oshawa, and others reported having observed conversion of Na to K and carbon to Fe in very simple discharge experiments carried out in the post war era.

In the upsurge of experimental activity during the 90s following the Fleischmann-Pons announcement, many experimenters have reported observing the presence of traces of "new elements" in the electrodes after the electrolysis runs. Careful investigations have ruled out the suspicion that these elements are deposited from the electrolyte, indicating the possible occurrence of nuclear transmutation reactions involving the host metal cathode. Other groups have independently reported observing products of transmutation reactions in a variety of experimental configurations such as glow discharge experiments and even light water electrolysis experiments.

In a very clean and stunning experiment Iwamura et al have reported the occurrence of transmutation reactions during the simple process of diffusion or permeation of D2 gas through a Pd complex on the front surface of which a layer of Cs was deposited. During the diffusion process a single Cs nucleus is found to simultaneously absorb four deuterons resulting in Pr.

In the light of all these developments the whole question of elemental transmutation warrants re- examination. Is it really true that nuclear transmutation reactions can and do occur in simple experimental configurations? Does the ruling dogma of Science regarding the non transmutability of elements need to be revised? If all this is true how did Science make such a big and glaring mistake in its evolution? These fundamental questions need to be addressed by the Indian scientific community with an open mind.

Status Report on Low Energy Nuclear Reaction (LENR) Research
for the
Workshop on Emerging New Energy Concepts for the 21st Century

National Institute For Advanced Studies, IISc Campus, Bangalore, India
Wednesday 9th January 2008
by Steven B. Krivit*

In 1989, at the University of Utah, Martin Fleischmann and Stanley Pons announced their discovery of a sustained nuclear fusion reaction. It was historically known as "cold fusion."

Today, the research is known as low energy nuclear reactions. The field is known as condensed matter nuclear science.

The claim that the phenomena was fusion was, and still is, highly speculative. Additionally, low energy nuclear reactions have been observed which cannot possibly be the result of Fusion processes.

Contrary to some mythologies and poorly-referenced sources, the primary and most important claim of Fleischmann and Pons, excess heat, was never disproved. Their papers reporting the excess heat phenomenon were published in peer-reviewed journals and never refuted.

The prominent laboratories such as Caltech, MIT and Harwell performed poor and inadequate replication attempts of the Fleischmann-Pons experiment and cannot be used as legitimate references for a "failure to replicate" the Fleischmann-Pons effect.

Perhaps the most significant reason for the failure to replicate was the failure to obtain the minimum loading ratio of deuterium to palladium, without which, excess heat is not possible. This parameter was first identified in 1991 by researchers at SRI International and will be reviewed in this workshop.

The dominant nuclear ash of the LENR reactions appears to be helium-4. Other secondary products, emissions and effects that have been observed in the experiments include the production of helium-3, tritium, low-level neutrons, transmutations, melted and vaporized palladium, craters, "hot spots," morphological deformations, X-rays and charged particles.

As was initially observed in 1989, the experiments still demonstrate the lack of greenhouse gases, long-lived radiation and strong prompt radiation.

Since 1989, LENR research claims, to its credit:

- Papers published in 55 peer-reviewed journals
- 13 International Conferences
- 29 Regional Conferences (Russia, Italy, Japan)
- 6 Recent books
- More than 200 active researchers from 13 nations
- Strong correlation between heat enthalpy and helium-4
- Rigorous calorimetrically measured excess heat
- Rigorous experiments reporting transmutation

The field has overcome a multitude of objections and criticisms. Two significant objections remain.

Widespread reproducibility does not exist, though a recent collaboration sponsored by DARPA between SRI International (U.S.), ENEA Frascati (Italy) and Energetics Technologies (Israel) demonstrated high reproducibility of the excess heat effect. The results of this group convinced DARPA to approve Phase 2 funding.

A collaboration between researchers in the U.S. Navy at SPAWAR San Diego, SRI International, the Russian Academy of Sciences and others have demonstrated a reproducible experiment that records particle emissions on solid-state nuclear track detectors.

No theory proposing D-D fusion in the LENR environment has been accepted for publication in a well-respected peer-reviewed journal, however an alternative theory, proposing weak interactions, has been published. This theory is considered highly unlikely by many researchers in the LENR community.

*** Brief Bio-data for Mr. Steven B. Krivit**

Mr. Steven B. Krivit is the editor of *New Energy Times,* a Web magazine dedicated primarily to news and information on low energy nuclear reaction (LENR) research. He is also the executive director of its parent organization, New Energy Institute, a U.S. 501(c)(3) nonprofit organization.

He is an author of a 2004 book on the cold fusion controversy, the author of forthcoming encyclopedia articles on low energy nuclear reactions in 2009 and 2010 and an editor for the American Chemical Society Sourcebook on LENR, to be published by Oxford University Press in 2008.

List of Delegates
January 9, 2008 Discussion Meeting

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1.	Chidangil Dr. Santhosh Division of Laser Spectroscopy Manipal Life Sciences Centre Manipal University, Manipal-576104
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5.	Krishnan, Dr R V Formerly National Aerospace Laboratory Bangalore
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