

AN OUTSIDER'S VIEW OF COLD FUSION

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ABSTRACT

An outsider's views are presented on ICCF-9, on cold fusion research issues, and on suggestions for improvement.

1. INTRODUCTION

I had the privilege of attending the first seminar on cold fusion given by Martin Fleischmann and Stanley Pons in March 1989. Our laboratory began an experiment in April, but support for that study was cut off a few months later, so I have been an outsider to this field since then.

The field of cold fusion research lacks respect and money. It is difficult to get respect if you don't have money, and it is difficult to get money if you don't have respect. I will discuss some impressions of this conference, some potential sources of funding, some negative factors, and some suggestions.

2. IMPRESSIONS

I have many good impressions from this conference. There is guidance from expert leaders, pioneers in the field like Martin Fleischmann and Academician Arata. There is emphasis on replication of results, as described by Mike McKubre. There is better understanding of matrix loading conditions and effects, and interesting results from use of thin films. There is good evidence of transmutations, such as transmutation of strontium into molybdenum and transmutation of cesium into praseodymium. These results should arouse worldwide attention. And there are several interesting theoretical ideas, including phonon coupling, resonant barrier tunneling, tetrahedral resonance, electron orbit shrinkage or dynamic deformation, and vortex dynamics. A worthwhile feature is that some theories suggest experiments that can be done to confirm or to disprove them. The conference organization and tour were excellent, and we can hope for replication of this good organization at the next conference.

3. DIFFICULTY OF GETTING FUNDING

Potential sources of research support are industry, private individuals, government, and foundations. Industry and individuals are interested in patents, scale-up, market control, and profits. They want immediate applications, so that the profits will appear in just a few years. These conditions are difficult for cold fusion to meet. Governments are sensitive to public opinion and to the opinion of the scientific community. Governments usually try to avoid embarrassment, which makes them averse to taking risks in research and development. They try to do what is "politically correct". Past government contributions to cold fusion research were severely criticized, and a recent DOE grant was withdrawn after the award had been decided. Unless the public and general scientific community respect cold fusion research, it will be difficult to get government support. Foundations want to know what the applications are, how soon they will be available, and how they will benefit people, but the underlying phenomena of cold fusion and designs of practical applications are not yet clear. Thus, none of these sources of funding is readily available to cold fusion researchers. In addition, there are several negative factors that complicate the problem.

4. NEGATIVE FACTORS

Most scientists are too busy with their own research to keep up with what is going on in other fields. They are skeptical of new ideas and tend to conserve existing paradigms. Therefore, most scientists, even in nuclear fields, are uninformed of cold fusion developments. Scientists are also concerned about funding competition: "If new research gets funded, will my support be reduced?" This kind of attitude was

partially responsible for lack of enthusiasm by the broader scientific community for the superconducting super collider project.

The public is swayed by the news media. The only scientific information that most people receive is from television, radio, newspapers, and news magazines. Journalists sometimes exaggerate mistakes, dangers, and controversies, because such exaggerations excite people, increase their audience, and sell more advertising. Unless journalists become more responsible, the public will continue to be misinformed. Such misinformation is responsible for the exaggerated fears of nuclear power.

The name "cold fusion" is also misleading. In some cases this phenomenon is not cold, and in some cases, such as transmutation of heavy elements, it may not be "fusion".

Some presentations at ICCF9 were disorganized and unrehearsed, some slides and posters were difficult to read, and some presenters read from manuscripts with little audience contact. These detracted from the quality of the conference.

There are few publications of cold fusion research results in mainstream scientific journals. For example, the one-person group at MIT has recently had difficulty getting a paper accepted for publication, and this is a common experience to many people in this field. There are some exceptions: As Editor of *Fusion Technology*, George Miley courageously accepted cold fusion papers for many years. Prof. Li published an important paper in *Physical Review C*, and some papers will be published in the *Japanese Journal of Applied Physics*.

In view of these funding difficulties and negative factors, I would like to pass along some suggestions for improving the respect and support for cold fusion research. Most of these are things that I have learned from conversations here at the conference.

5. SUGGESTIONS

1. We could use the new name "condensed matter nuclear sciences" instead of "cold fusion". This was the consensus of the ICCF9 Steering Committee.
2. We could form a new technical society, as discussed by Dr. Takahashi.
3. We could start a new journal, as discussed by Dr. Biberian.
4. A benchmark experiment could be organized, to have several labs do the same experiment and compare results.
5. A joint review article could be submitted to a mainstream journal, stressing reproducibility of results. This would help gain respect for the field, although it could be difficult to get the article accepted for publication.
6. We could offer an annual prize for the best paper or achievement, and name the prize after Juliano Preparata.
7. We could insist on higher standards for talks, posters and articles at future conferences. These would not immediately impact outsiders, but they would raise the standards of the field.
8. Someone could study potential applications, looking at conceptual designs, how they could be carried out, and what their benefits would be. Although preliminary, such a study could help gain interest from funding agencies and respect for the field.

In conclusion, this field of research is operating in a very difficult environment: irresponsible journalism, negative public opinion, ignorance by other scientists, profit-hungry corporations, and risk-averse governments. Respect may be gradually attained by publications in mainstream scientific journals if the negative bias can be overcome to get papers accepted. The field could also be helped by a better name, an annual prize, higher standards for presentations, and a study of potential applications.