

TEXAS A&M UNIVERSITY

DEPARTMENT OF CHEMISTRY

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June 20, 1989

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Dear Dr. Thompson:

Many thanks for coming to see us. It was an enjoyable visit for us.

I think one of the roles Johnson-Matthey can play, apart from being so good as to lend us palladium and organize analyses for Fleischmann and Pons, is to act as an evaluating center for the results which are coming in from all over the world on this subject.

I think it less likely that a Laboratory heavily funded for hot fusion work is going to be able to see cold fusion. The investigators literally don't see it, for the phenomena are inconsistent and allusive, and it is easy to gloss over the occasional occurrence.

At the Santa Fe meeting, one of the people from Oak Ridge asked me to come to a separate room, shyly removed some documents from his briefcase, and said, "My boss will kill me if he thinks I'm showing you these things. You see, they're positive."

This shows how important it is to look towards parts of the world which are influenced less by the local negative and restrictive environment, - where everyone is afraid it will reduce their funding, -and look to countries where people have got less to lose.

I find white Americans even more xenophobic than the British! It's difficult to get American scientists to believe that results done outside the U.S., Japan, Germany and Great Britain are reliable. Their image of the rest of the world is that they're backward, and that science and engineering are done in the countries I've named.

Well, my list of Cold Fusion workers follows. It's in two parts. The first is from people I know. The rest is from people I have heard about. You'll probably find that when you have investigated it, my list is very incomplete.

Heat

The best work is with Mackubre at Stanford Research Institute. He got rid of the difficulty of recombination by using a deuterium fuel cell anode. Incidentally, there is a Group from DOE going around. However, it has only three electrochemists (electroanalytical ones at that) out of around 20 members and its clear that it had made up its mind NO PHENOMENA EXISTS before

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it came to us.

Usi Landau at Case Western is an excellent and solid worker. He gets neutrons and tritium as well as heat.

Huggins: I am not so certain about Huggins as I am about the other people. However, he says that after about a day heat begins to build up. It builds down again if he lets the wet atmosphere of the room into the cell.

Here at Texas A&M within my subgroup, we had three cases of heat out of ten electrodes.

As you saw, however, Dr. Srinivasan has more than that. I am very worried about his calorimeter. Perhaps your explanation was the best one: If it's a surface effect, the very small electrodes would have much more surface-to-volume ratio than other people's.

Wadsworth at Utah: Good work, and helpful. Three bursts, one lasting several hours. Wadsworth is a metallurgist.

Neutrons

More than a dozen people say they can detect tiny amounts of neutrons. In my opinion, these reports are important as proving that some nuclear events are occurring. They will not now, of course, explain the heat.

The best work, in my opinion, has been done by Kevin Wolf at Texas A&M, an extraordinarily careful investigator. He has seen bursts which last about two hours. They decrease with increasing current density. They change with cleaning of the surface electrode.

The next best is probably Jones' work from Brigham Young, particularly the work he has done under the Grand Sasso mountain in Italy.

Professor Grozzi at the University of Rome has also seen neutrons, but only in one burst.

Mizzuno at Hokkaido University in Japan, Nuclear Engineering Department, has also seen one burst.

Tritium

This is the most important type of work, and if one could see tritium regularly, then we should be at the end of the beginning, because there's no way whatsoever in which tritium can be produced from deuterium chemically.

At Texas A&M, we have had a completely certain determination of tritium in eight electrodes out of eleven - "completely certain" because of its determination by five independent organizations outside Texas A&M and two Dr.

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with it

However, there are some questions which remain about our tritium work: Why did three electrodes out of eleven not give tritium? Further, was it so that the electrodes which gave tritium gave no heat? We do not know. We do know, however, that some electrodes which give heat do not give tritium in the solution.

Another group which reports tritium are Schoesser and Wellingford. These persons are, as it were, "sleepers" in the game. Schoesser is a retired professor of nuclear engineering. Wellingford is a younger professor. Two chaps working away quietly in their spare time. They have roughly the same amount of tritium as we have.

Grozzi told me at Santa Fe he had 4,000 counts per minute per milliliter of tritium - our level - but has not replied to my cable asking him to phone me to see if these results have been confirmed.

Another tritium report comes from Applaby who gave a recent lecture at the Mexican Petroleum Institute in Mexico City. He told me that a worker called Morales had got 10^5 count/min ml there. This would be important but must be confirmed.

After this, my list is more scattered.

Dr. David Schiffirin at the University of Southampton and Dr. R. Armstrong at Newcastle are just beginning. Dr. David Williams at Harwell is not so -ve as he states. He has seen short burst of heat, and a few occasional neutrons and some increase in tritium. He cannot reproduce it - but neither can the rest of us.

I suggest you get in touch with Professor Shengmin Cai, at the Chemistry Department of the University of Peking, Beijing, PRC, who would be a mine of information from the large Chinese groups. I gave you a brief report of the telephone conversation I had with Professor Cai about two weeks ago. Some of the results reported there were positive. Of course, the Revolution may hinder communication.

Only one team claimed that they observed fusion heat, but the excess was not high (I do not know that quantity). Professor Cai said it may not be 100% true, because they did not repeat the experiment.

According to the Chinese National Science Research Council, a report signed by several nuclear physicists, electrochemists, radio-chemists was sent to NSRC two weeks ago. In the first 20 hours of electrolysis, no neutrons were observed, then at 20 hours, neutron counts start to climb up to 100 times of background. The count was 700(counts)/80 minutes - 8.9 counts/minutes. They charged another Pd of the same size and the same source, they observed the similar phenomena.

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Dr. K.S.V. Santhanam, has used NaCl in D₂O as electrolyte and Pd and Ti as cathodes. The maximum excess heat observed was -50%. Three experiments with neutron counting showed the counts to be 48%, 8% and 13% higher than the background.

Two other groups one at the Bhabha Atomic Research Center in Bombay and other at the Indira Gandhi Center for Atomic Research in Kalpakkam worked with Pd cathode. The group at Kalpakkam observed 30% increase in neutrons over the background level.

In Poland, presently there is one group quotes confirmation of P-F results. They are from University of Gliwicz. The names of persons are Strojck and Zbik. They work with 1M LiOD solution and observed for some electrodes flow of neutrons, 300 neutrons/S above background (I do not know what is their background) for 5600s. They prepared Pd electrode by anodic polarization.

In Hungary, there is Dr. Csikai, KLTF, Debrecen, Kiserliti Fizika. I talked to Dr. Csikai on the telephone quite early on in the game, and he has neutrons which he can resuscitate by wiping the electrode after they have died out. He says right out that it's a surface effect.

The Soviet Union: In Moscow, there's a man whose name is Runin Kutznov - he hasn't replied to my cable or to my letter. My colleagues in Moscow did not reply when I asked for his telephone number.

There is said to be a group in Kiev.

In Australia is Terry Quickendon at the University of Western Australia Perth, Chemistry Department.

A telephone call to Dave Koch at Monash University might be a good idea, - he would know of other groups in Australia.

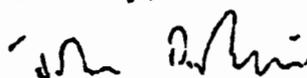
There are some people working in Brazil, but I only know about it from the Newsweek report, which did give a list of people working all over the world.

This is a good beginning for your master list, and look forward to hearing some of your evaluations of these various works. Because all this is developing so quickly, it might be good to have two categories: "reported" (from telephon interview, say) and "confirmed" (by visits).

I wonder if Johnson-Matthey shouldn't ask you to visit some of the people at the laboratories concerned? This would be very valuable to the field - and of course to Johnson-Matthey.

Good wishes,

Sincerely,



J. O'M. Bockris