

MEMORANDUM

February 26, 1991

TO: Distribution

FROM: David Worledge *DW*

SUBJECT: REPORT ON MEETING WITH MARTIN FLEISCHMANN (MF)

The following points of interest emerged from our meeting at Fleischmann's home on February 7, 1991. In general MF is more confident than ever of both heat and neutron effects and claims absolutely reproducible excess power approaching 1000 W/cm³ of Pd.

1. General features of Pd electrolytic experiments to maximize reproducibility and magnitude of excess power:
 - High degree of cold work in cathode samples is important.
 - MF is unaware of any special contamination in the palladium but recent work with palladium alloys (perhaps Pd-Ag and Pd-Ce) has been very beneficial.
 - Mildly abrade the cathode surface to remove oxides, platinum or other contamination that may have reached the surface during casting or high temperature annealing.
 - Charge at low current density, keeping the current constant, avoiding periods of D₂ dissolution that may lead to cracking.
 - Maintain uniform electrode spacing to keep the current density uniform.
 - Avoid cracking; charging at low and steady current density and the use of alloys probably help. Larger diameter rod shaped electrodes (≥ 8 mm \varnothing) crack more easily than \varnothing - 1-4 mm. Cracks prevent high loading.
 - Minimize electrolyte volume to cathode surface area to minimize subsequent contamination of cathode surface.
 - Measure cathode potential and use it to monitor behavior of the electrochemistry. Their new data shows large increases in overpotential with large excess power.

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2. MF has a strong conviction that temperature transients are important. Hence, does not favor isothermal calorimetry.
3. He does not believe internal surface (eg voids) plays any obvious role. Similarly, does not know of any 'magic' electrolyte or surface recombination poison. MF feels that poisons may eventually play a major role in promoting greater current efficiency in D charging but does not at present know of a poison that can be relied on to stay chemically stable and not "contaminate" the cathode surface during long charging periods.
4. He does not know the optimum H/D ratio.
5. MF is convinced that neutrons are coincident with excess power episodes at a rate of 10-50 n/sec per excess watt. He claimed that tritium generation was not proportional to excess power, but might be a surface reaction connected with an impurity in the D₂O - at any rate from a source different from that giving rise to excess power and neutrons.
6. Measurements of dissolution rate of D from Pd on removal of cathodic potential show that often the D is trapped and retained in the lattice beyond the thermodynamic equilibrium quantity for prevailing temperature and pressure. The same point was made to me by D. Thompson at Johnson Matthey. Thompson has data showing anomalous retention was greatest for samples that had produced excess power. McKubre also measured anomalous retention in samples that charged quickly to high atom ratio.
7. Fleischmann and Johnson Matthey are willing to provide Pd cathodes that produced high levels of excess power for EPRI to arrange ⁴He assay. These experiment will be done double blind including their archived stock material.
8. Fleischmann and Pons are apparently willing to extend this ⁴He assay arrangement to their new experiments that claim 1000 w/cm³ Pd.

DHW:cln

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