Missouri
ENERGY SUMMIT

Prospects for the Discovery of New Energy Science

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Cold Confusion

- First report of a possible nuclear fusion in palladium loaded with heavy hydrogen: Berlin, Germany, September 17, 1926 by Professors Paneth and Peters.
- Detection of confirmed nuclear fusion in liquid heavy hydrogen at -422F (-252C) in Russia, Berkeley and other places from 1954 to 1959

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Catalysis of Nuclear Reactions between Hydrogen Isotopes by μ^- Mesons

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(Received January 10, 1957; revised manuscript received February 4, 1957)

Cold Confusion, but now in the 'Age of Mass Media'

- Pons and Fleischmann (PF), University of Utah Press Conference, March, 1989
  - Very bad media strategy
  - A very negative reaction by the physics community within the United States
  - Real science, possibly with outstanding engineering consequences, suddenly becomes a 'pariah science'
- Hundreds of 'excess heat' results from at least 20 independent labs repeat PF results, from 1990 to 2009

The 60 Minutes Story, 4/19/09

- Visit to Energetic Technologies in Omer, Israel, in October, 2008:
  - Observed excess heat while I was there
  - Three different cell designs, all very different, all have reported excess heat
  - Five cells have reported excess heat exceeding 1,000,000 J from a 0.3g (0.01 oz.) Pd foil electrode
    - Chemical heat release would have been about 100 J
    - (Heat out) / (Electrical energy in) = 25, 15, 8, and less
  - Quite similar results from many other labs in Italy, Russia, China, Germany, and the USA (mainly SRI and US Navy)
  - Particle tracks: Navy SPAWAR in March, 2009.
  - Work underway at the Navy Research Labs (NRL) in DC

So What is Going On?

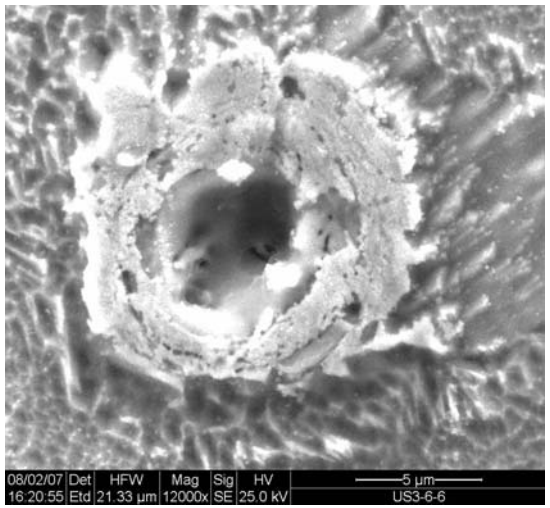
- We don't know – it will take a lot of well controlled experiments to figure this out.
- The 'excess heat' appears to be real. That is enough to motivate serious study.
  - My first hypothesis: Muon-catalyzed D + D fusion near (but not in) the palladium.
  - One possibility: Micro-craters found on the Pd surface by ET in Israel, and by Navy SPAWAR

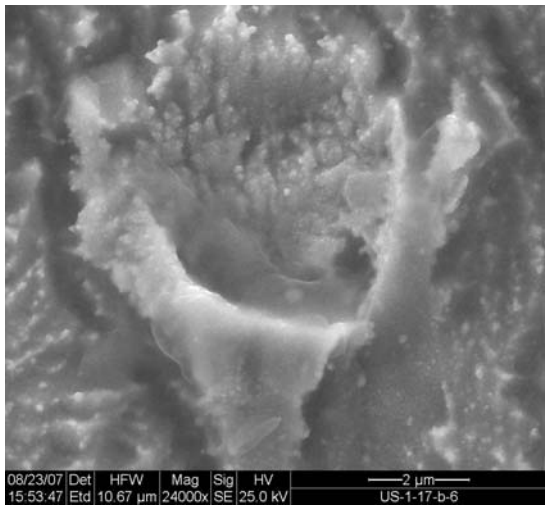
One Possibility:
Imagine this happening …

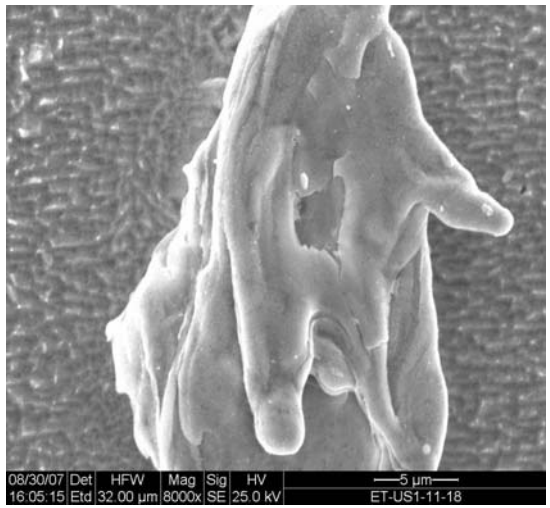
Except 100 million times smaller!

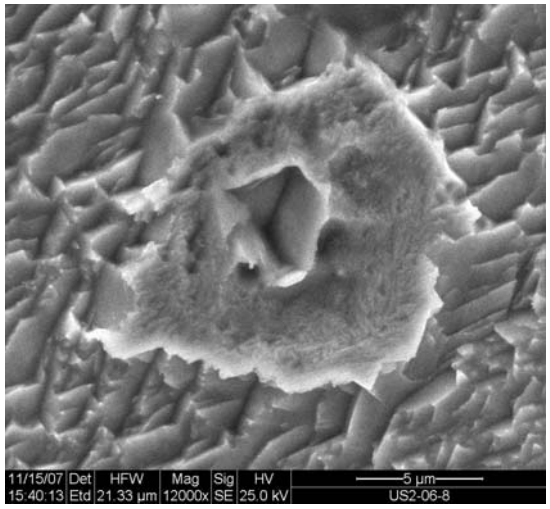
SEM images from Energetic Technologies Ltd. in Omer, Israel

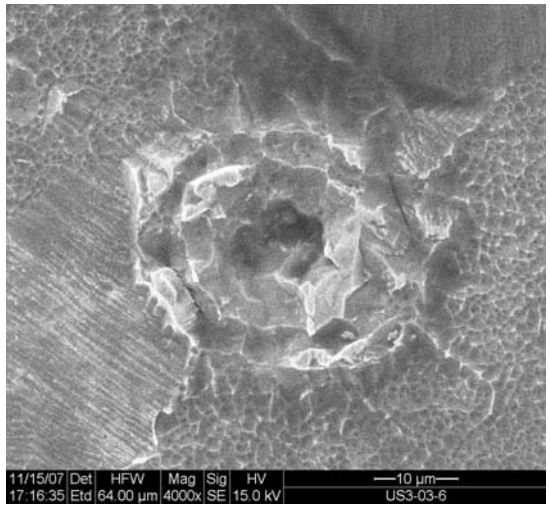
Micro-craters in palladium following extreme heat release when loaded with heavy hydrogen

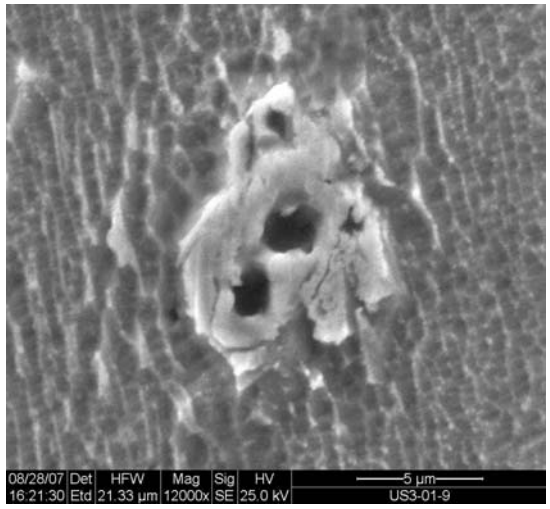




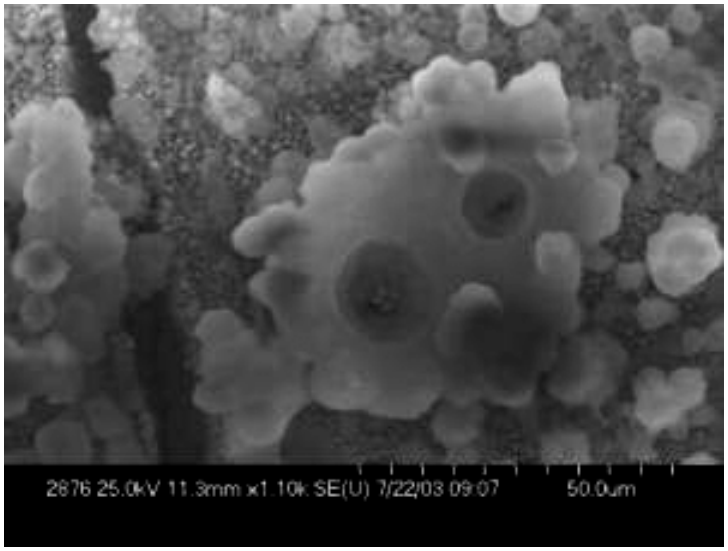


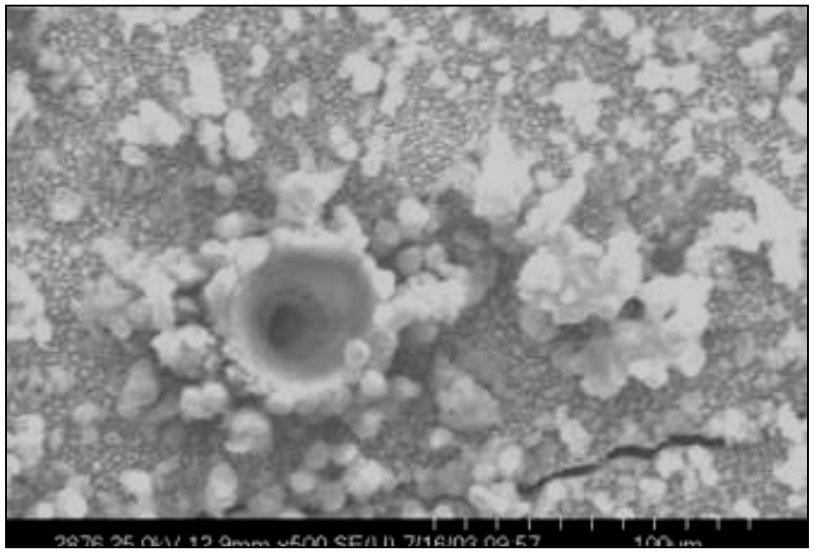


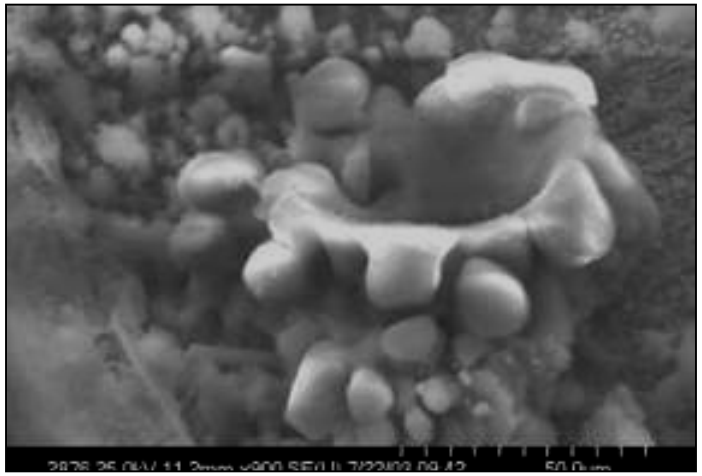




SEMs Obtained for a Cathode Subjected to an E-Field Showing Micro-Volcano-Like Features







- All data and images are from Navy SPAWAR's released data, presented at the American Chemical Society Meeting in March, 2009.

Any ‘Lessons Learned’ Here ?

- There is a HUGE gap between new science discovery and useful engineered systems
  - Don’t speculate wildly, manage expectations!
  - Pursue basic science BECAUSE you don’t understand!
  - I really don’t know if this science will ever lead to energy production
- Mass media needs to approach new discoveries carefully in light of the first point above
- Research funding needs to become less dependent on the common assumptions within the culture of scientific communities, and much more courageous and objective
- The Scientific Method is a wonderful thing, use it always, no exceptions!