



MECH 431 REPORT COLD FUSION Fall 2006

In 1989, Fleischmann and Pons at the University of Utah made the startling announcement that they had discovered “cold fusion” in a simple electrochemical experiment. The typical nuclear fusion reaction, which converts hydrogen to helium, occurs at extremely high temperatures. Cold fusion aims to conduct the same reaction *at room temperature*. The announcement by Fleischmann and Pons was therefore unbelievably important—the scientists submitted a paper to *Nature* and courted an eager media. But when researchers at various universities tried to duplicate the results, the outcomes were mixed. Some reported success, while others declared the discovery bogus. Ultimately, the experimental results were shown to be false.

Your assignment is to analyze the cold fusion controversy and write an original report of no more than 1500 words explaining the significance of this event to a hypothetical audience of young engineers. Where—ethically and/or experimentally—did Fleischmann and Pons go wrong? What did their errors reveal about the nature of the scientific process? What does this episode teach young engineers about laboratory results and experimental design?

Your primary sources should be two texts that are being held on reserve in Fondren Library (see references below). You may consult other sources (e.g., books, Internet) provided you cite those sources in your paper. You may also discuss the topic with group members or others with knowledge of the topic. *Your report, however, must be your original work.*

Your report should include the following sections:

- An abstract of no more than 150 words that summarizes the main points of your paper. The abstract should succinctly state the purpose of your report, provide the high level issues about the cold fusion controversy most critical to your conclusions, and summarize the conclusions you have reached. Remember that an abstract always stands alone; a reader should be able to read the abstract and get a picture of your report. Conversely, a reader that skips the abstract should not lack the information in it.
- An introduction/background section that describes, in your own words, the experiments conducted by Pons and Fleischman, the results reported, and the historical reaction to the findings.

- A discussion section that delves deeper into controversy. This is where you analyze the historical facts to arrive at your conclusions. Your discussion should demonstrate an understanding of the experimental conclusions Pons and Fleischman reported and the work done to support and debunk their experiments. You should also consider the media response, research protocols followed (or not followed) by Pons and Fleischman, and ethical considerations. Ultimately, be sure that your discussion addresses the questions raised in the assignment description above.
- A conclusion section in which you state your conclusions based on the analysis in the discussion. Your conclusions may be broad (concerning the business of doing science) or specific (directed at how young engineers should conduct themselves in the laboratory), but must be supported by material presented in the discussion.

The attached rubric will be used to grade your report. Please consult it for guidance on organizing your report. Your grade will be determined by how well you construct your argument and organize information to support your conclusions about the “cold fusion” controversy.

References (on reserve at the library):

- 1) Taubes, Gary, **Bad Science**, Random House, New York 1993
- 2) Huizenga, John R., **Cold Fusion**, Oxford University Press, New York 1993