



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

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<b>Project Title</b> Cold Nuclear Fusion	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> My objective was to see if I could create an alternate energy source using a cold nuclear fusion reaction. I used a method similar to that of the well known cold fusion experiment by Drs. Fleischmann and Pons. If it is achieved, cold nuclear fusion could provide a nearly limitless energy source. Running on just water, scientists speculate cold fusion reactors could take the top ten feet of Lake Michigan and use it to generate enough power for the whole United States for 1500 years. Although cold fusion has been confirmed by several research laboratories, it has been dismissed by others and, hence, has not irrefutably been proven to be successful.</p> <p><b>Methods/Materials</b> I used several variations of water. However, I will focus on the solution called deuterium oxide (D2O). I poured D2O into a jar and inserted a thermometer and two electrodes (platinum anode, palladium cathode) connected to a power supply. I sent electricity through the D2O, which broke down into deuterium and oxygen. The atoms were ionized by electrons and moved to the electrode opposite their charge. Negatively charged oxygen moved to the positive anode, while positively charged deuterium moved to the negative cathode. Had the experiment been successful, the deuterium would have concentrated in the palladium. This high concentration would have been enough for the nuclei to touch, causing the deuterium atoms to bond with one another, forming helium. In addition, this process would have released energy in the form of heat.</p> <p><b>Results</b> I did three tests, each involving a different solution. I used regular water and seawater as a basis for comparison against the D2O. In the test with D2O, the temperature only rose 1 degree (F). The current flowing through the solution fluctuated. I burned the collected gas, showing that stable helium had NOT been produced. These factors indicate that no fusion reaction occurred.</p> <p><b>Conclusions/Discussion</b> My experiment shows that fusion can not be accomplished using this particular method. The deuterium gas did not condense enough to fuse. More work will be required before nuclear fusion can be generated in this way. If I were to repeat this experiment, I would get more deuterium oxide so I could perform more tests, using different variables. I would also add lithium salt to my electrolyte solution instead of table salt. Lithium salt would greatly improve conductivity, which would allow for a better chance of fusion occurring.</p>	
<b>Summary Statement</b> Is it possible to conduct cold nuclear fusion using the Fleischmann and Pons method?	
<b>Help Received</b> Parents helped order materials and set up apparatus.	