

Preface

Last year, 2005, was the hundredth anniversary of Einstein's miracle year, 1905, when he wrote three revolutionary papers on the special theory of relativity, the Brownian motion of microscopic particles and the photoelectric effect, respectively. These were some of the epoch-making discoveries in the revolution of physics from classical to modern which occurred at the beginning of the last century.

In these hundred years, physics evolved into modern physics based on quantum mechanics and the theory of relativity from classical physics, which was founded 400 years ago in the sixteenth century, by pioneers such as Galileo Galilei and Isaac Newton. Modern physics became one of the fundamental foundations of our highly industrialized society and, ironically, had lost its pioneering spirit by the end of the twentieth century.

At the end of March 1989, sensational news appeared in the mass media, reporting the unbelievable realization of so-called cold fusion, nuclear fusion reactions in palladium deuteride crystals achieved in a small beaker on a laboratory bench by Martin Fleischmann and Stanley Pons. This is the origin of the "cold fusion scandal" which lasted 9 months, during which mostly negative but some positive reports were published. A hastily issued report by the U.S. Department of Energy in November 1989 concluded that cold fusion research should not receive priority funding by the government.

The most important factor of the controversy about the cold fusion phenomenon (CFP), a phenomenon pertaining to experimental results is the Fleischmann's hypothesis (or F-P's hypothesis), an enormous enhancement of fusion reactions of two deuterons resulting in helium-3 and a neutron, or a triton and a proton, and/or helium-4 and gamma, in an environment of transition-metal deuterides. A few researchers succeeded in replicating the Fleischmann-Pons (F-P) experiment, obtaining huge excess heat, surplus neutrons and/or tritium, but many did not. These researchers have analyzed their data on the Fleischmann's hypothesis and many have cast strong doubt on the positive experimental data and/or denied the reality of the hypothesis.

It is helpful for our investigation of the cold fusion phenomenon (CFP) to understand clearly (1) the Fleischmann's hypothesis that led to the experimental results by Fleischmann et al., published in 1989 and (2) critics such as Huizenga who did not believe their data, and subsequently in the existence of the CFP.

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