Reifenschweiler, O., *Cold Fusion and Decrease of Tritium Radioactivity*, in *LENR-CANR.org*. 2003.

Cold Fusion and Decrease of Tritium Radioactivity

Otto Reifenschweiler

Retired from Philips Research Laboratories, Eindhoven, The Netherlands. Current actress: Jan Sluytersweg 13, NL-5645 JA Eindhoven, The Netherlands.

In recent papers (1, 2, 3, 4) the author has deduced from experiments with tritium (5) that during heating of a $TiT_{0.0035}$ -preparation and of a $TiT_{0.035}$-preparation the radioactivity of the tritium decreased strongly. This strange effect was distinctly confirmed by the observation that with the $TiT_{0.035}$-preparation the radioactivity decreased 12.5 times stronger than the release of tritium (2,3,4). A quite independent proof of the strong decrease of λ of tritium could be obtained by a thermodynamic evaluation of the heating experiment with the $TiT_{0.0035}$-preparation: Assuming that λ of tritium decreases to zero or nearly zero in a part of the tritons enables the determination of the number of tritons with normal λ, n_T and the number of tritons with $\lambda \approx 0$ n_{To}, both as a function of temperature. Then quite surprising n_T and n_{To} follow the laws of chemical equilibria in distinct parts of the experimental $A = f(T)$-function. From this unexpected result the decrease of tritium radioactivity is definitely proved once again (6).

All these experiments are performed with titanium preparations obtained by evaporation of the metal in argon at a suitable gas pressure, e.g. 0.2 to 2.5 cm of mercury. A comprehensive description of the evaporation procedure is given in Ref. 3. Fig. 1 shows an electron micrograph (5) of a preparation as used in our experiments. Further electron micrographs of such preparations are displayed in Fig. 2 of Ref. 7 and Fig. 1 of Ref. 8. The preparation consists of **small** (dia. ≈ 15 nm) **monocrystalline** Ti-particles which are **arranged in chains.** I assume that these properties or one or two of them are necessary conditions for the decrease of tritium radioactivity. This assumption is confirmed by the observation, that a decrease of tritium radioactivity is never observed with Ti-preparations which are generally used for storage of tritium (9). Such preparations don't have the above stated properties. They consist of single and big non monocrystalline Ti-particles, in my experience.

The arrangement of our Ti-particles in chains with many ramifications results in a very open structure of our preparation. There is much empty space between the Ti-particles of different chains. The time constant for the uptake of tritium is about 10 seconds (stated in thousands of experiments for technological applications). This ensures that the tritium is absorbed to an equal concentration by the different Ti-particles (maximum of entropy).

There is a strong suspicion that cold DD-fusion (10) and decrease of tritium radioactivity are caused by the same or a related fundamental principle (2, p. 171). A decrease of tritium radioactivity was obtained with Ti-preparations which are described in full length earlier. I propose thus a cold fusion experiment applying the same preparation with which decrease of tritium radioactivity was obtained:

Prepare a same Ti-preparation by evaporation of the metal in argon (3) as done in our heating experiments. Absorb deuterium in this preparation to obtain $TiD_{0.5}$ to get hydride phase (6). Slowly increase the temperature of the preparation to several hundred degrees centigrade as

done in our heating experiments (see e.g. 3). Measure the fast neutron emission as a function of temperature. It is most interesting if the same or a similar dependence of neutron emission from temperature is obtained as with the decrease of tritium radioactivity. Experiments with different deuterium concentrations are recommended to arrive to a theoretical explanation of the effect (6).

References

1. O. Reifenschweiler, "Reduced Radioactivity of Tritium in small Titanium Particles", Phys. Lett. A, 184, 149 (1994).

2. O. Reifenschweiler, "Some Experiments on the Decrease of the Radioactivity of Tritium sorbed by Titanium", Proc. 5th Int. Conf. on Cold Fusion, April 9-13, 1995, Monte Carlo, Monaco.

3. O. Reifenschweiler, "Some Experiments on the Decrease of Tritium Radioactivity", Fusion Technol. , 30, 261 (1996).

4. O. Reifenschweiler, "Solid State Environment Effects on Radioactivity", Radiat. Phys. Chem.,51, 327 (1998).

5. J. F. van de Vate, O. Reifenschweiler and G. van der Ligt, "Onderzoekingen naar de Temperatuurvastheid van fljnverdeelde Metaal-Ttritium-Systemen in Vacuum", Internal Report of the Philips Research Laboratories (1961) (In Dutch) (unpublished).

6. O. Reifenschweiler, "Further Evidence Of The Decrease Of Tritium Radioactivity By A Thermodynamic Evaluation Of A Heating Experiment", to be published (*).

7. O. Reifenschweiler, "A Suitable Tritium Carrier for Gas Discharge Tubes", Proc. Conf. Peaceful Uses Atomic Energy, Geneva, Zwitzerland, 1958, Vol. 19, p. 360

8. O. Reifenschweiler, "Hydrogen Pressure Regulator with high Absorption Rate", Rev. Sci. Instrum., **35,** 456 (1964).

9. R. Cox, Private Communication (1996).

10. M. Fleischmann and S. Pons, "Electrochemically induced Nuclear Fusion of Deuterium", J. Electroanal. Chem., **261,** 301 (1989).

(*)
The manuscript can be obtained on request from the author.

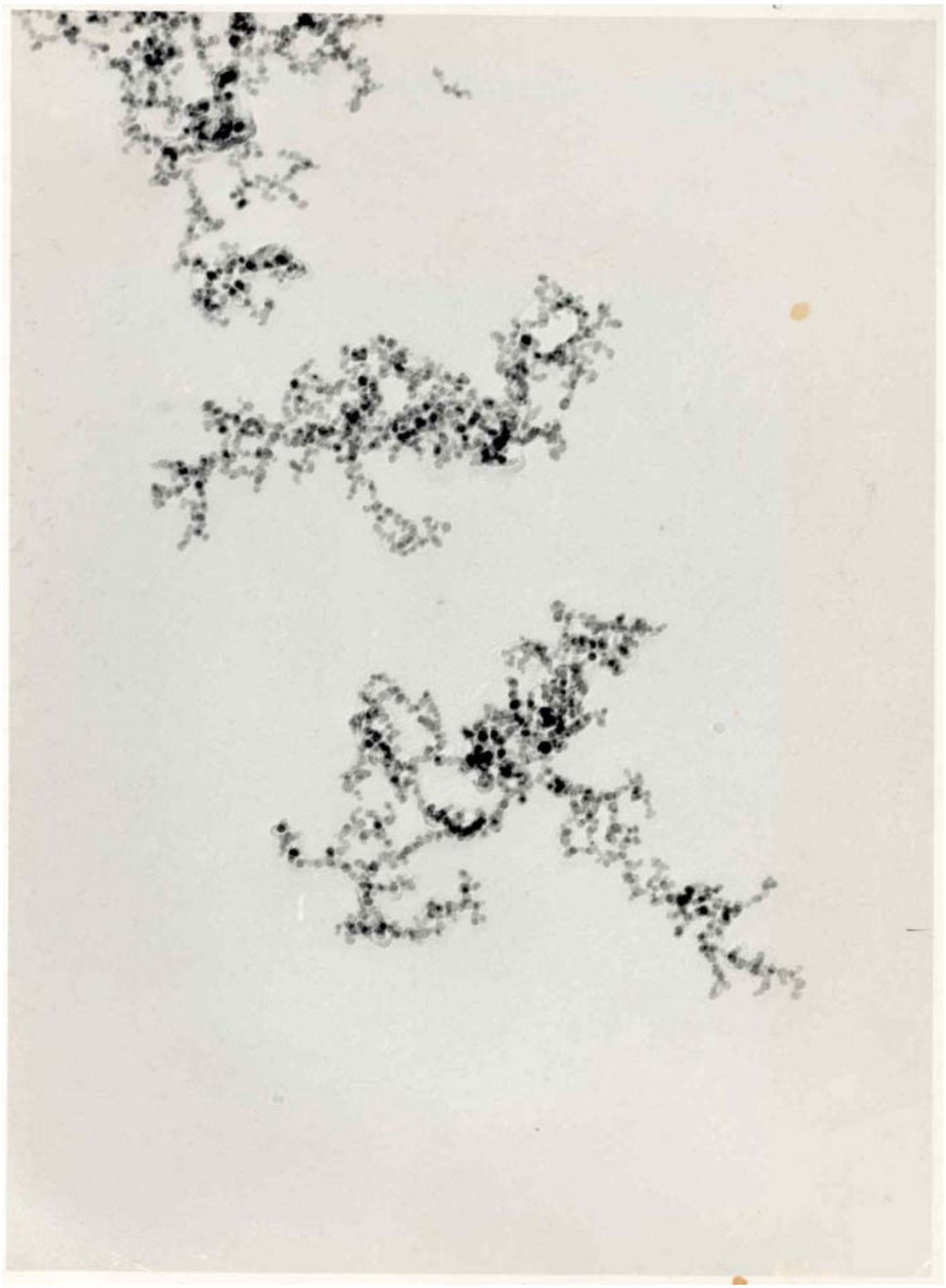

Fig. 1. Electron micrograph of Ti-preparation obtained by evaporation in Argon. Argon pressure 2.15 mm of mercury. Magnification 120,000. Improved evaporator (3).