

Anomalous Heat Induced by Deuterium Flux in a Bunch of Long-Thin Palladium Tubes using PID Method for Calorimetry

¹Zhan M. Dong, ²Shu X. Zheng, ²Qiang Du, ¹Chang L. Liang, ^{#1}Xing Z. Li

¹Department of Physics, Tsinghua University, Beijing CHINA. lxz-dmp@tsinghua.edu.cn

²Department of Engineering Physics, Tsinghua University, Beijing CHINA

In 15 year continuous experiments, gas-loading deuterium-palladium system has evolved from a long-thin palladium wire to a bunch of long-thin palladium tubes (Fig. 1). Calorimetric analysis has evolved from high precision Seebeck micro-calorimeter (C-80) [1] to a high precision digital power supply controlled by a PID system. Triggering mechanism has evolved from pumping outside the palladium tube to pumping inside the palladium tubes. The pure palladium wire has evolved to quaternary alloy tubes (Pd-Ag-Au-Ni). Anomalous heat has been induced by a deuterium flux through the thin wall of the palladium tubes. It lasted several hours. It manifested itself as a spontaneous oscillation of temperature with an exponentially growing amplitude first (Fig.2). The maximum temperature has been extended from 120⁰C to 150⁰C. A flow-calorimeter is going to apply for confirmation of this anomalous heat effect.

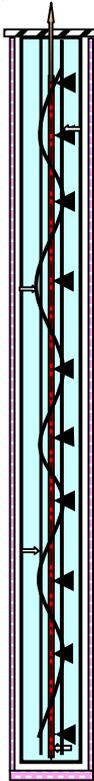


Fig.1

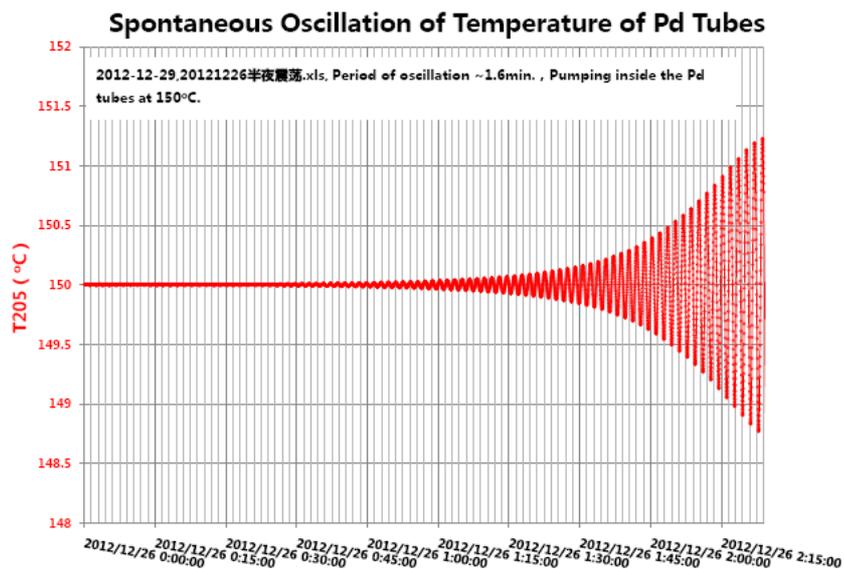


Fig.2 a spontaneous oscillation of temperature with an exponentially growing amplitude

This anomalous heat effect in deuterium-palladium has a positive temperature coefficient. It would have had driven the system unstable if there had been no PID controlled power supply

An anomaly in the Ni-Cr heating wire has been identified in the deuterium gas after heating around 150⁰C. It appears as a negative temperature coefficient of electrical resistance with anomalously large magnitude. This heating feature constitutes the seeds of a spontaneous oscillation of temperature.

[1] Xing Z. Li, Bin Liu, Jian Tian, Qing M. Wei, Rui Zhou, and Zhi W. Yu, "Correlation between abnormal deuterium flux and heat flow in a D/Pd system," Phys. D: Appl. Phys, vol. 36, pp. 3095-3087, 2003.