The Possible Reasons of External X-Ray Radiation of LENR Installations

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In numerous experimental LENR-related works were presented the results of investigation of hard electromagnetic radiation emitted from working chamber when palladium or nickel samples were exposed to deuterium and hydrogen. Such effects were observed regularly during electrolysis, gas discharge, thermocycling etc. Intensity of this radiation was uncorrelated with heat generation and isotope changes into working chamber. Moreover, this radiation was frequently registered in absolutely abnormal systems - e.g. behind the "black" screen (wall) which thickness much surpasses absorption mean free path of radiation.

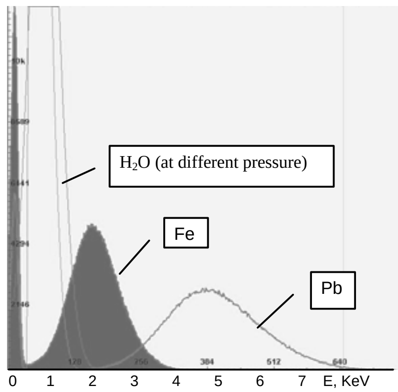

Fig. 1

These abnormal results are similar to the results of investigation of external X-Ray radiation generated on outer surface of closed chamber at cavitation of liquid [1,2]. In these works the radiation processes have been associated with a liquid (machine oil or water) jet moving through the narrow channel. It has been found during detailed investigation that the outer surface of the working chamber are sources of intense X-radiation, generation of which is related to cavitation processes in the liquid jet bulk and subsequent excitation of internal shock waves. Interaction of these shock waves with external surface atoms of water jet, metal tube or thick screen leads to external X-Ray generation. The frequency (energy) of X-radiation depends on the types of atoms on a radiating surface (for a jet, it is water; for a channel, the metal atoms on the surface (e.g. Fe, Cu, Pb, etc) and increases with the increase of atoms charge (Fig.1). The total X-ray activity of working chamber reaches Q≈0.1 Ci.

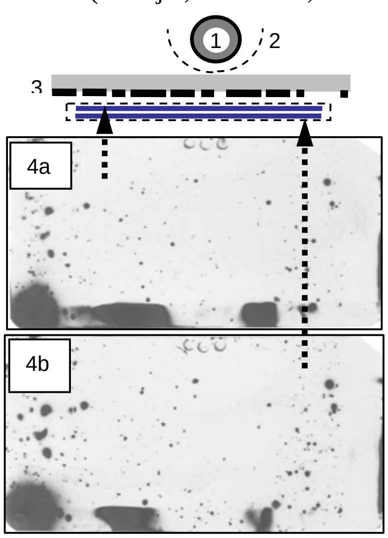

Fig. 2

It was found for the first time that the impact of shock acoustic waves 2 (Fig. 2), which are formed in the air as a result of cavitation in water jets 1, on distant thick screen 3 (made of stainless still with stickiness 3 mm) leads to the generation of a quasi-coherent directional X-ray emission from the back side of screen 3, that was registered by two films 4a,4b stacked to each other! The spatial parameters of this radiation depend on the shape and size of the screen and characteristics of shock wave.

There is a high probability that X-Ray phenomena observed at explosion of cavitation bubbles and connected with the interaction of cavitation induced shock waves with outer surface of working chamber or screen are similar to X-Ray phenomena, which take place during generation of similar shock waves at fast formation of numerous micro-cracks at loading and interaction of hydrogen or deuterium with metals matrix during electrolysis, gas discharge or thermocycling. These processes are discussed also.

1. A. A. Kornilova, V. I. Vysotskii, N. N. Sysoev, A. V. Desyatov, Generation of X-Rays at Bubble Cavitation in a Fast Liquid Jet in Dielectric Channels. Journal of Surface Investigation. X-ray, Synchrotron and Neutron Techniques, v. 3, no. 2, pp. 275–283, 2009;

2. A. A. Kornilova, V. I. Vysotskii, N. N. Sysoev, N. K. Litvin, V. I. Tomak, A. A. Barzov, Generation of Intense X-Rays during Ejection of a Fast Water Jet from a Metal Channel to Atmosphere. Journal of Surface Investigation. X-ray, Synchrotron and Neutron Techniques, v. 4, no. 6, pp. 1008–1017, 2010.