TALES FROM THE LABORATORY OF EXPERIMENTAL PHYSICS. Part 2

LENR Research In Ukraine And Russia. By Alan Smith.

Editors Note:- This document is entirely (and closely) based on extensive information found at http://tet.in.ua/index.php/en/ describing the innovative work carried out over several years (up to early 2015) by Andrew Hrischanovich and colleagues at the Laboratory of Experimental Physics, Zaporozhye near Kiev, Ukraine and by others based at their sister laboratory in Moscow. I apologise in advance if my unpick and re-knit attempts have led to any errors of fact or interpretation.

THE TIGER REACTOR – SUMMING UP

Without going into a detailed description of all our experiments with the Tiger system, we can say that (in some cases) we saw close correlation between excess thermal and the adsorption/desorption of Hydrogen into Titanium powder. Control experiments using powdered brass in a Hydrogen atmosphere gave no excess heat. However, we realised that the complex power supply control system – it is required to operate precisely over a very wide range - from only 3 watts to initiate the corona 'spark' discharge and then increasing up to 400 watts for a glow discharge makes it an unsuitable design for a high energy density reactor.

MEETING ALEXANDER PARKHOMOV.

We attended a workshop/seminar entitled "Cold fusion and Fireballs" at the People's Friendship University, Moscow, on 25 December 2014. After listening to A.G. Parkhomov's report on his replication of the Rossi reactor, we decided to conduct a similar experiment. We invited Alexander to visit our laboratory and had a very friendly and constructive meeting. During the meeting we discussed the details of his experiment, and clarified our understanding of the processes occurring in his ceramic reactor.

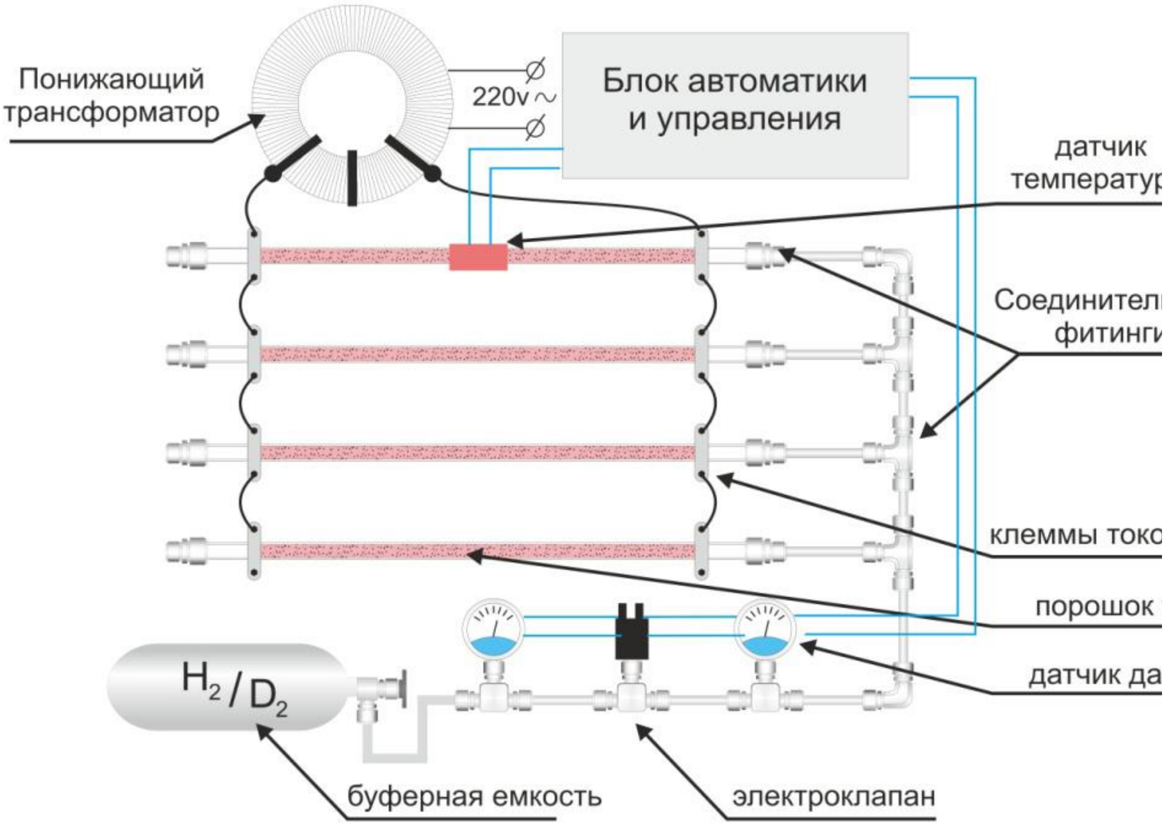
The main difference between our work so far and that of Parkhomov and Rossi is that we used a Hydrogen/Titanium system, while Parkhomov and Rossi concentrated on Hydrogen/Nickel. Experiments in other laboratories have shown that if the Hydrogen is replaced by Deuterium, all other things being equal, the excess heat produced doubles. t. Nuclear diagnostics applied to the D/Ti system recorded a brief neutron flash and a pulse of gamma radiation, which shows once again that the nature of this phenomenon is not solely chemical. *Prior art* in the study and application of D/Ti belongs to S. A. Tsvetkov (Russia) who 1997 was granted Russian Federation Patent № 2145123

Titled:- ‘Method of Nuclear Fusion and a Device for its Implementation’.

We consider it both significant and interesting that when using the Tiger reactor at Hydrogen pressures up to 15 ATM. we saw oscillations of both temperature and pressure at a constant input power to the reactor. The reaction was beginning to "breathe" and maintain a stable state. Very similar 50-degree temperature oscillations are visible in the experimental data of A. G. Parkhomov, occurring when the temperature in his system reached 1300°C. When the reaction is in such a stable self-oscillating mode and has not gone "off the rails", it is important to carefully maintain a balance between both the energy input and heat output.

DESIGNING PRACTICAL HEATING SYSTEMS.

On the basis of our research experience we feel ready to start manufacturing cost-effective electric boilers and heaters. We expect energy costs of using this type of heating to be as low as 1/3 or 1/4 that of a comparable conventional heating system. It will enable customers to eliminate or significantly reduce gas consumption. In cases where it replaces electric heating, the cost of heating homes, gardens, offices and industrial premises could be reduced by a factor of 6 or 7. The advantage of our proposed system over H/Ni systems which require ceramic reactors operating at over 1300C is that the working temperature is in the range 650°C-950°C. At this temperature more conventional materials can be used to construct both reactor and heat exchangers, allowing them to be 'hybridised' with currently used conventional heating elements. For example, in timber dryers, grain dryers, heated poultry houses, etc. In industry they could supply heating for plastic extruders, injection moulding machines and many other purposes. It would is also-



-possible to replace gas burners in domestic and industrial boilers using a 'drop in' version of the reactor which would not require major alterations to the heat exchanger or other in-line components. An important segment of this market includes market (glasshouse) gardens and flower producers, country houses, cottages, and other places where there is no power grid or gas distribution piping. Even where gas heating is possible, there may be a monthly limit on the volume of gas used, which currently leads many people to install a duplicate electrical boiler system for the coldest periods of the year.

CIONSTRUCTING A PROTOTYPE FUEL CARTRIDGE.

The proposed high-temperature fuel module (VTM) is constructed as follows. Stainless steel tubes (grade 316L) with a diameter of 10-15mm and a length of 300-500mm are used. These may be coated with a thin ceramic layer to provide both insulation and corrosion/oxidation protection. The tubes are each loaded with 30-50 grams of Titanium powder or possibly compressed Titanium 'tablets'. The approximate service life before replacement of the powder or tablets is required we estimate to be 6 months. The thermal output of a single tube 300mm long will be 1 to 2 kW. A tube length of 500mm is expected to yield 3 to 4 kW. To achieve greater capacity where required, the more than one tube may be combined into a single module. The use of high-grade stainless steel tubeing and Swagelok (Germany) or Hy-Lok (South Korea) gas valves, will make the heating elements are safe and long-lasting. The block diagram shows an assembly of four VTM tubes in a single module. A step-down transformer fed from 220 or 380V AC lowers the system voltage to 5V. This current is supplied - via the control system- to high-current terminals located at each end of the stainless tubes. This provides a reliable and easy way of heating, and is much preferred (for many reasons) to using external wire-wound resistance heaters. The system is supplied with sufficient high-pressure Hydrogen capacity (1 litre) as well as pressure and temperature sensors all monitored by an automated control system.

6. CURRENT EXPERIMENTS

More promising for heating in our opinion, are thermal modules producing lower temperatures - from 50°C to 120°C (NTMs).

These heaters exploit the ability of some intermetallic compounds such as LaNi5 and FeTi to interact with Hydrogen/Deuterium at room temperatures and pressures above 20Bar. In this case, there is no need to use electrical energy and the reaction starts immediately when the tube is pressurised. Thus we have an entirely autonomous source of heat. According to some experimenters, after pressurising with Deuterium at 30Bar, in a reactor containing the low-temperature intermetallic PdZr in powder form, the wall temperature of the reactor rose from ambient to 80°C and remained there for two days. It is safe to assume that this can also be done with a much more affordable intermetallic compound - FeTi. We expect in our experiment to see the same oscillation process, rising and falling temperatures that we observed in the high-temperature reactor. What the possible duration of this reaction, the period of self-oscillations and the possibility of a reaction to kesatuan *(? A.S.)* is will be answered by experimentation.

Such a reactor would contain a manufactured multifunctional hydride and a valve-controlled high pressure hydrogen system. Quartz reactors can best be replaced by stainless steel high pressure containment. If our testing of an ‘HTM’ fuel element is successful, it will be much easier to fit into any heating system.

Original document created 15 March 2015 by Lead Project Officer Hrischanovich Andrei Petrovich.

Collaborating with:- Experimental Laboratory, Moscow, Russian Federation, and Laboratory of Experimental Physics "TET", Zaporozhye, Ukraine.

Alan Smith, February 2015.