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Research Article

High Temperature LEC Experiments

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Abstract

The Lattice Energy Converter (LEC), discovered by Gordon and Whitehouse, has opened the way to a new form of energy production with the important characteristic of directly generating electricity. Experiments conducted so far, performed near room temperature, have shown that a voltage is generated between an activated electrode—obtained by palladium deposition—and a reference electrode in hydrogen or deuterium atmospheres. These studies have also demonstrated that the generated voltage varies with temperature. Since both palladium and hydrogen are used in Cold Fusion as well as in LEC experiments, this similarity suggests that the two effects may share a common origin.

The authors of the present paper have previously reported excess heat production using nickel alloy nano powders (Ni/Cu) embedded in an amorphous alumina matrix after activation and reduction of a hydrotalcite precursor. However, the excess heat was observed only above approximately 700 °C.

To investigate whether excess heat and the LEC effect arise from the same underlying mechanism, we designed a device capable of performing LEC experiments with powders at temperatures up to 950 °C. The results show that the LEC effect occurs within the same temperature range as the observed excess heat. These findings support the hypothesis that the LEC effect and Cold Fusion phenomena may originate from a common mechanism.
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Keywords: LEC; Cold Fusion; Mechanism; Hydrogen

1. Introduction

The Lattice Energy Converter (LEC) was discovered by Gordon and Whitehouse [1], who demonstrated that a voltage is generated between an activated electrode—typically palladium—and a reference electrode made of various materials

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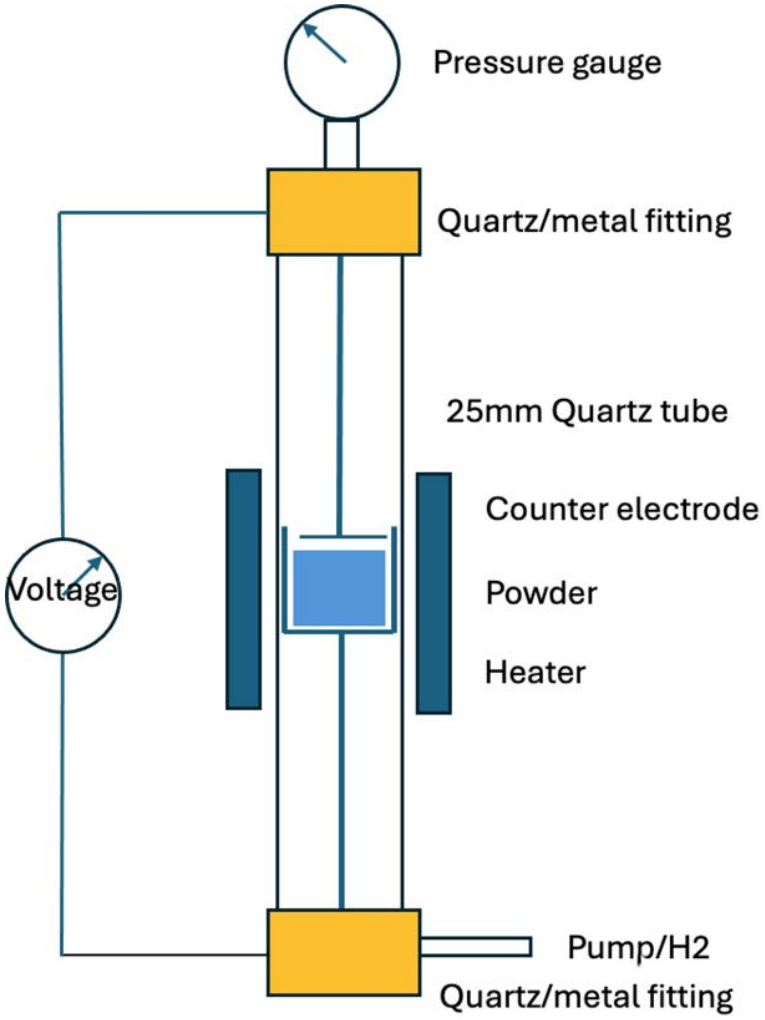


Figure 1. Sketch of the design of the high temperature LEC device.

in a hydrogen or deuterium atmosphere. They also reported that the generated voltage varies with temperature, up to approximately 200 °C [2].

In LENR-type experiments, we have previously shown [3] that excess heat can be observed using nickel alloy nano powders (Ni/Cu) embedded in an amorphous alumina matrix, obtained after activation and reduction of a hydrotalcite precursor. However, this excess heat appears only above about 700 °C.

Since LEC effects have primarily been reported using palladium—the first material employed in Cold Fusion studies—it is of interest to investigate whether similar materials and conditions could produce both excess heat and an LEC effect. To explore this possibility, we designed an experimental setup capable of performing LEC measurements at temperatures up to 900 °C.

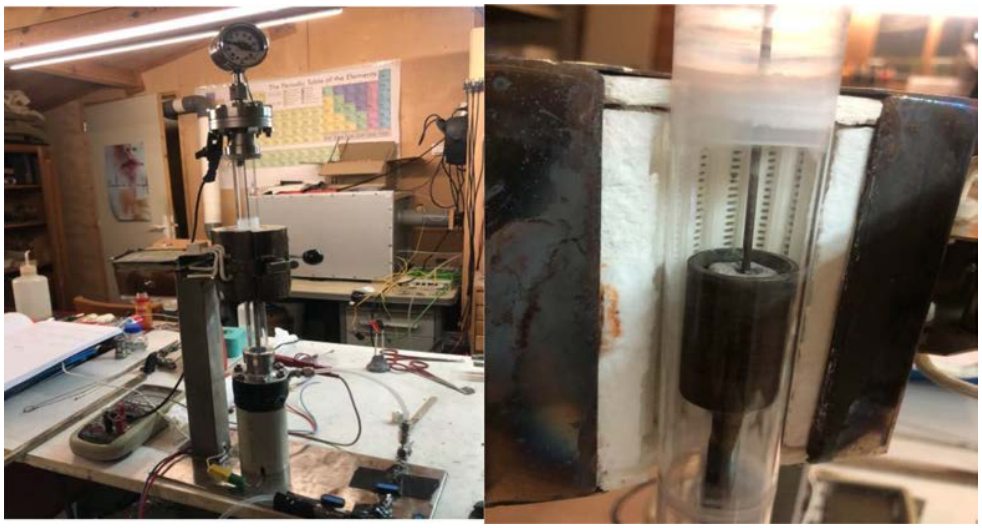


Figure 2. Two pictures of the experimental set-up.

2. Experimental Set-up

The setup is composed of a quartz tube 33 cm long and 25 mm in diameter, with a crucible inside. The powder to be analyzed is placed in the crucible. A small heater is placed outside the tube to heat the crucible. (See Fig. 1) The bottom of the quartz tube is equipped with a quartz/metal fitting, through which passes a 6 mm stainless steel tube for pumping out gas, and for the introduction of hydrogen. The lead wire for a K-type thermocouple also passes through this fitting. The thermocouple is positioned near the crucible. The top of the quartz tube is equipped with another quartz/metal fitting containing a pressure gauge and a metal rod with a stainless-steel counter electrode positioned one or two millimeters above the crucible. The voltage is measured between the two fittings.

3. Experimental Results

3.1. Excess Heat

Experiments with nanoparticles of nickel–bismuth alloys embedded in an amorphous alumina matrix have shown the production of excess heat [3]. Figure 3 shows a curve of excess heat vs. temperature. There is no excess heat below 700 °C; above this temperature excess heat begins, and then increases exponentially with temperature.

3.2. LEC voltage

The same material used to produce excess heat (described in section 3.1) has been employed in the high temperature LEC. The solid blue line in Fig. 4 shows the voltage as a function of temperature, obtained after several cycles of heating in hydrogen and cooling in a vacuum using the same method described previously by Biberian et al. [3].

We have also analyzed the voltage with an oscilloscope. Figure 5 shows that the voltage is composed of a constant voltage superimposed with short pulses. The frequency of the pulses is not constant and varies between 2 and 4 kHz.

Figure 6 is a zoom of the voltage showing the shape of the voltage pulses composed of a negative pulse of about 30 mV followed by a positive peak of 80 mV.

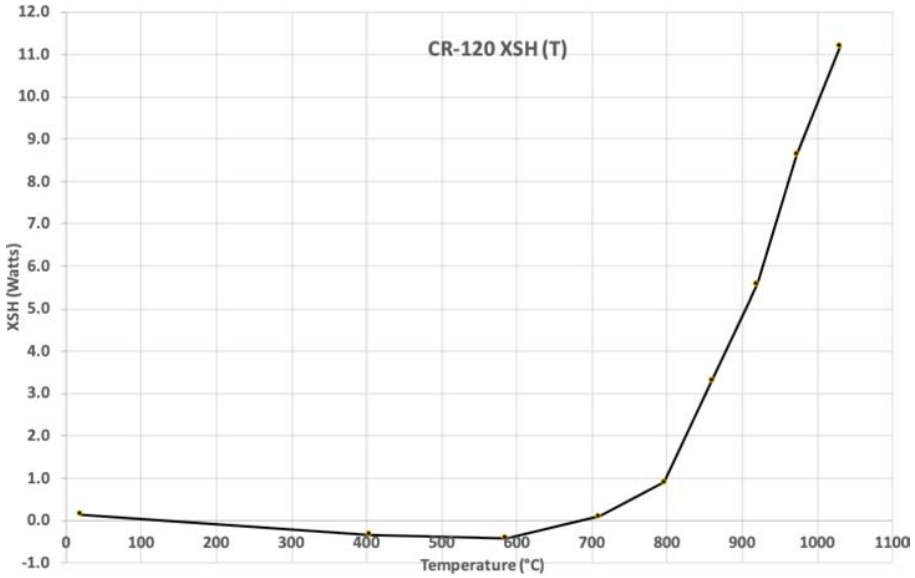


Figure 3. Excess heat vs. temperature, showing an exponential increase with temperature above about 700 °C.

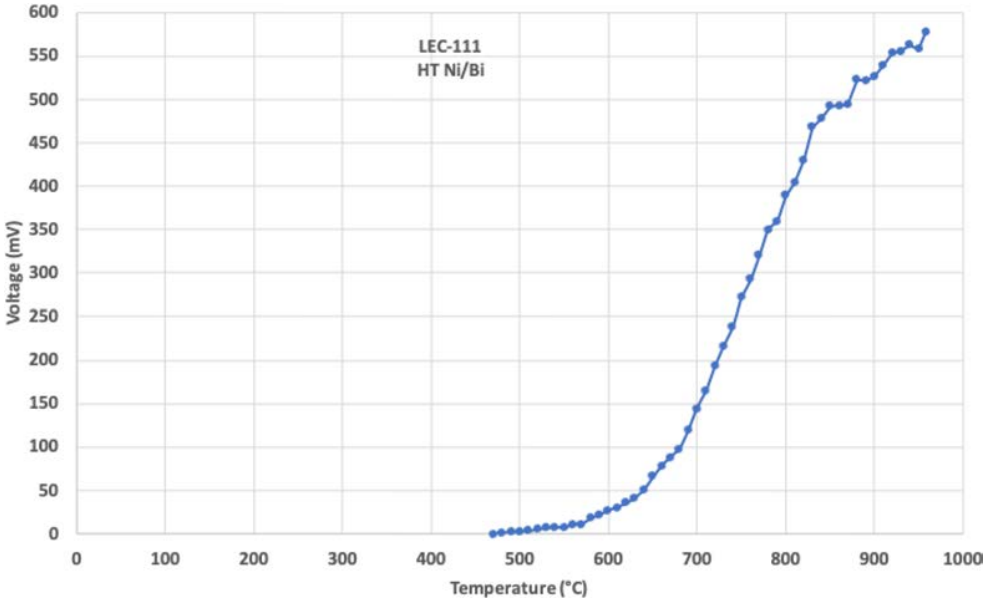


Figure 4. LEC experiment showing the voltage between a Ni/Bi nano powder vs. temperature.

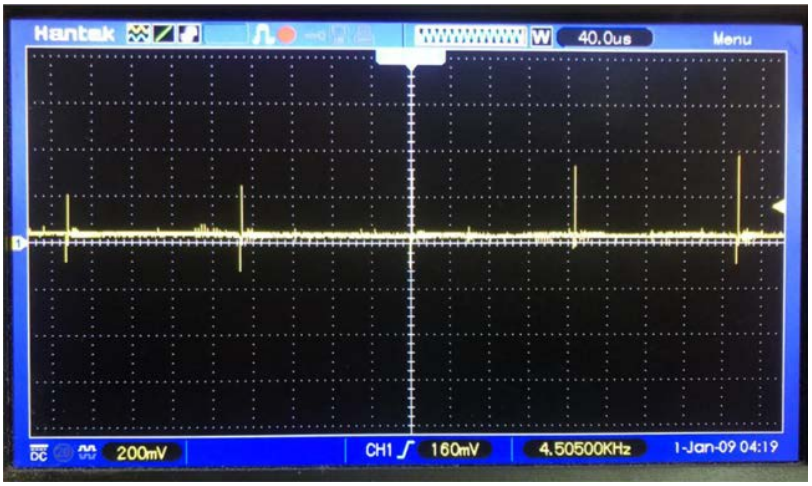


Figure 5. Screenshot of the voltage showing both a DC component and short pulses.



Figure 6. Details of the voltage pulses.

4. Conclusion

The voltage obtained at high temperature cannot be coming from thermionic emission, because it only occurs under a hydrogen atmosphere, and there is no emission in a vacuum. We have shown that the same powder used for heat production was also capable of producing a LEC voltage at high temperatures. The variation of excess heat vs. temperature is very similar to the increase in voltage produced by the LEC. This strongly suggests that the same mechanism is at work in both experiments. This conclusion is in agreement with the one obtained by Storms [4] showing that the LEC effect is of the same origin as Cold Fusion.

References

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