RNBE 2020

21 Novembre 2020

A summary

The French Society organises a meeting every 2 years called RNBE (Low Energy Nuclear Reactions)

RNBE 2020: 11 presentations in total

General reviews - Not summarized here

European Projects : CleanHME – HERMES - see below

Experimental results : 3 presentations – see below

Theories : 3 presentations (not reported here)

European Project : CleanHME

Project funded by the EUROPEAN UNION

- 16 partners
- 10 universities and research centers : Szczecin (Poland) – Maritime University (Poland) – CNRS (France) – Politecnico di Torino (Italy) – Josef Stefan Institute (Slovenia) – Institute for Solid State Nuclear Physics (Germany) – Uppsala University (Sweden) – INFN (Italy) - Siena University (Italy) – Lakehead University (Canada)
- 6 companies: SART von Rohr (France) – VEGATEC (France) – Broadbit Energy Technologies (Slovakia) – Lifco Industrie (France) – FutureOn (Italy) – Lakoco (Belgium)
- Budget: 5.5 M€

European Project : CleanHME

Project funded by the EUROPEAN UNION

- Objectives:
- Develop a new source of energy based on Hydrogen-Metal-Energy
- Develop a theory to explain the HME phenomena

- Roadmap:
- Experiments to measure screening energies of protons and deuterons in accelerators at very low energies
- Replicate results already published on nano-powders and gas-loading experiments
- Develop other active materials

European Project : HERMES

- 6 universities and research centers : Turku University (Finland) – TU Munich (Germany) – CNRSv(France) - Brno University (Czechia) – Imperial College (UK) – Limerick University (Ireland) – Aalto University (Finland)

- Budget: 4 M€

Project funded by the EUROPEAN UNION

European Project : HERMES

- <u>Objectives:</u>
- Study in experiments and on computer models the influence of isotopic effects in hydrogen loaded materials
- <u>Roadmap:</u>
- Use state-of-the- art technologies to prepare, characterize and study electrochemical Pd-D system, both at room temperature and at temperatures up to 1100 K.
- Focus on method development, with the special emphasis on reproducibility.
- If no nuclear effects are observed, obtain information of the isotope effects for hydrogen evolution.

Project funded by the EUROPEAN UNION

Lattice Energy Converter (LEC)

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21 November 2020

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A Surprising Discovery

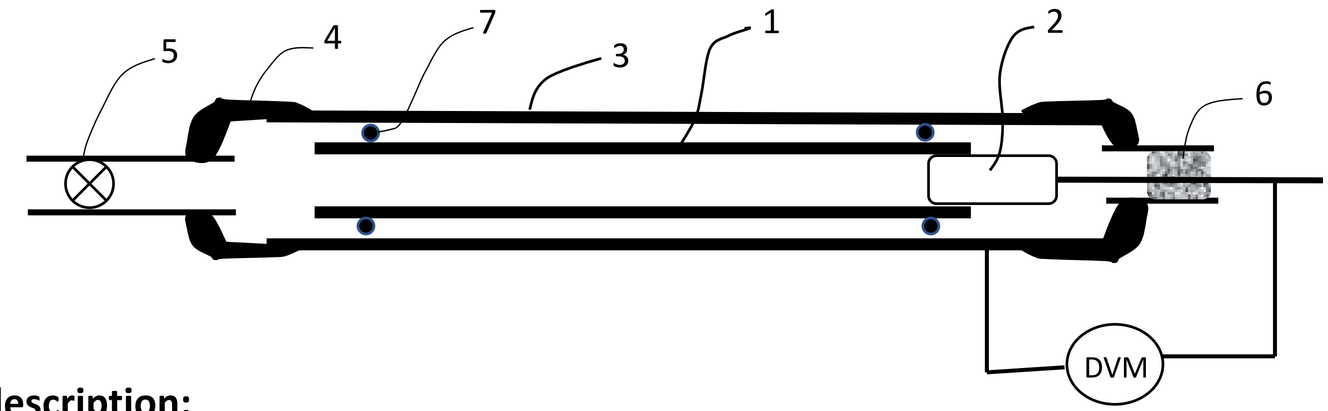
- While conducting experiments to see if we could ionize a gas using 6 μCi of Am-241 to load hydrogen into a Pd lattice and retain it using fugacity, we realized that the amount of current that we were conducting was several orders of magnitude greater than expected from the Am-241
- The current conducted during tests using the Am-241 but with a working electrode that was not codeposited with Pd-H was below the sensitivity of our instrumentation
- Stimulation of ionization with radiation was not required since tests without the Am-241 conducted!

Conclusion: The Pd-H was ionizing the gas!

Extraordinary Claims Require Extraordinary Evidence

A LEC cell producing spontaneous and self-sustained electrical energy for several weeks into a DVM with a 10 MΩ input impedance

Example of LEC Cell Construction

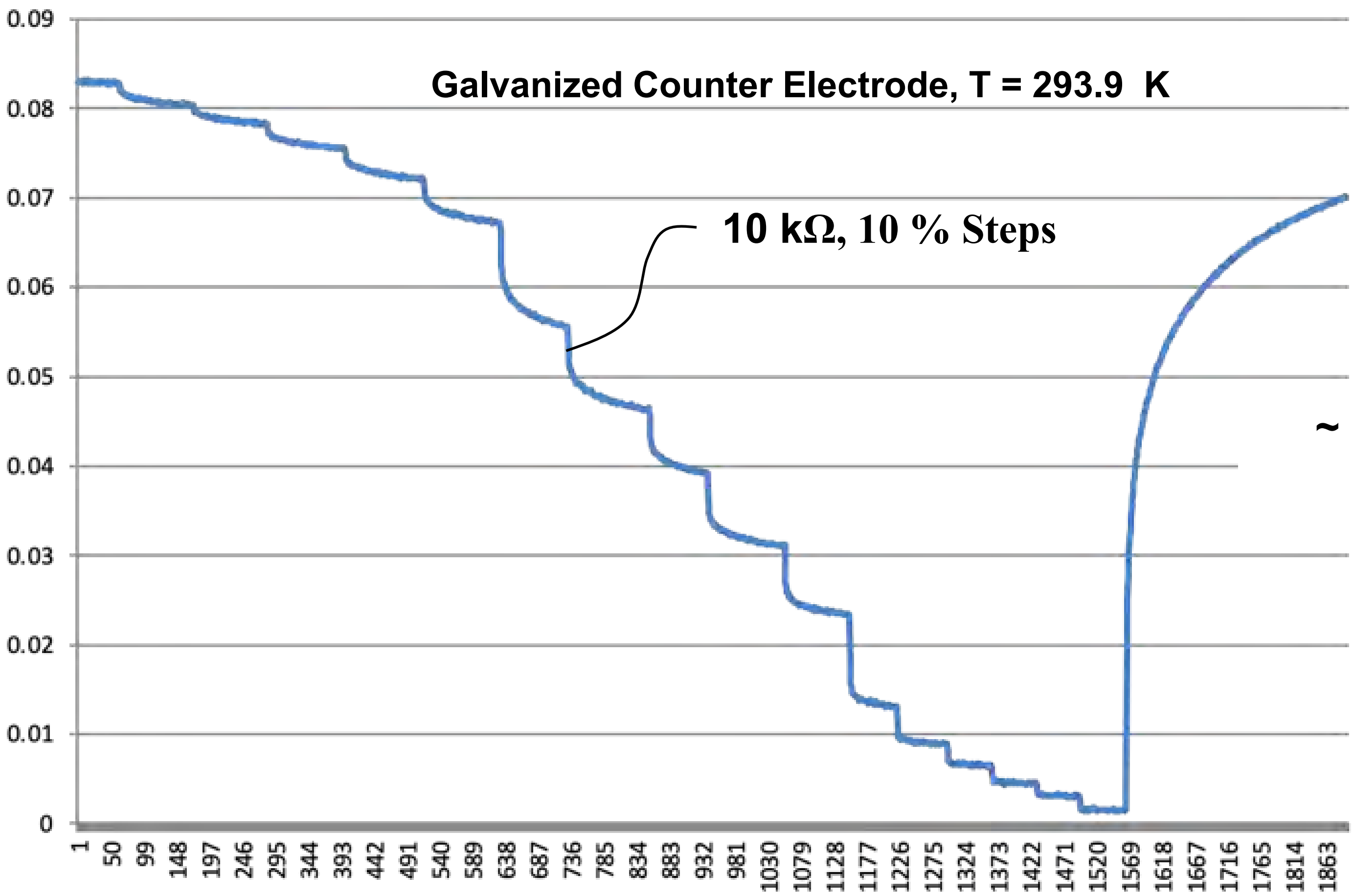


LEC cell description:

1. ⅛ inch by 4 inch brass nipple with id threaded at one end with 5/16 – 24 tap and then codeposited with Pd-H or Pd-D
2. 5/16 x 24 set screw with Cu wire brazed on one end and screwed into threaded nipple
3. ⅜ inch by 5.5 inch brass or galvanized pipe nipple (provides different work functions between outer pipe and the inner brass nipple.)
4. ⅜ inch to ¼ inch bushings on each end of the ⅜ inch nipple
5. ¼ inch nipple and valve to evacuate and fill LEC with hydrogen or deuterium gas
6. ¼ inch nipple with high temperature epoxy fill to provide electrical insulation
7. Small high temperature O-rings or a bead of high temperature epoxy to maintain physical separation between items 1 and 3 while allowing gas to pass between. Note O-rings provide separation and do not seal the gas

LEC Cell Voltage Measurement under Load

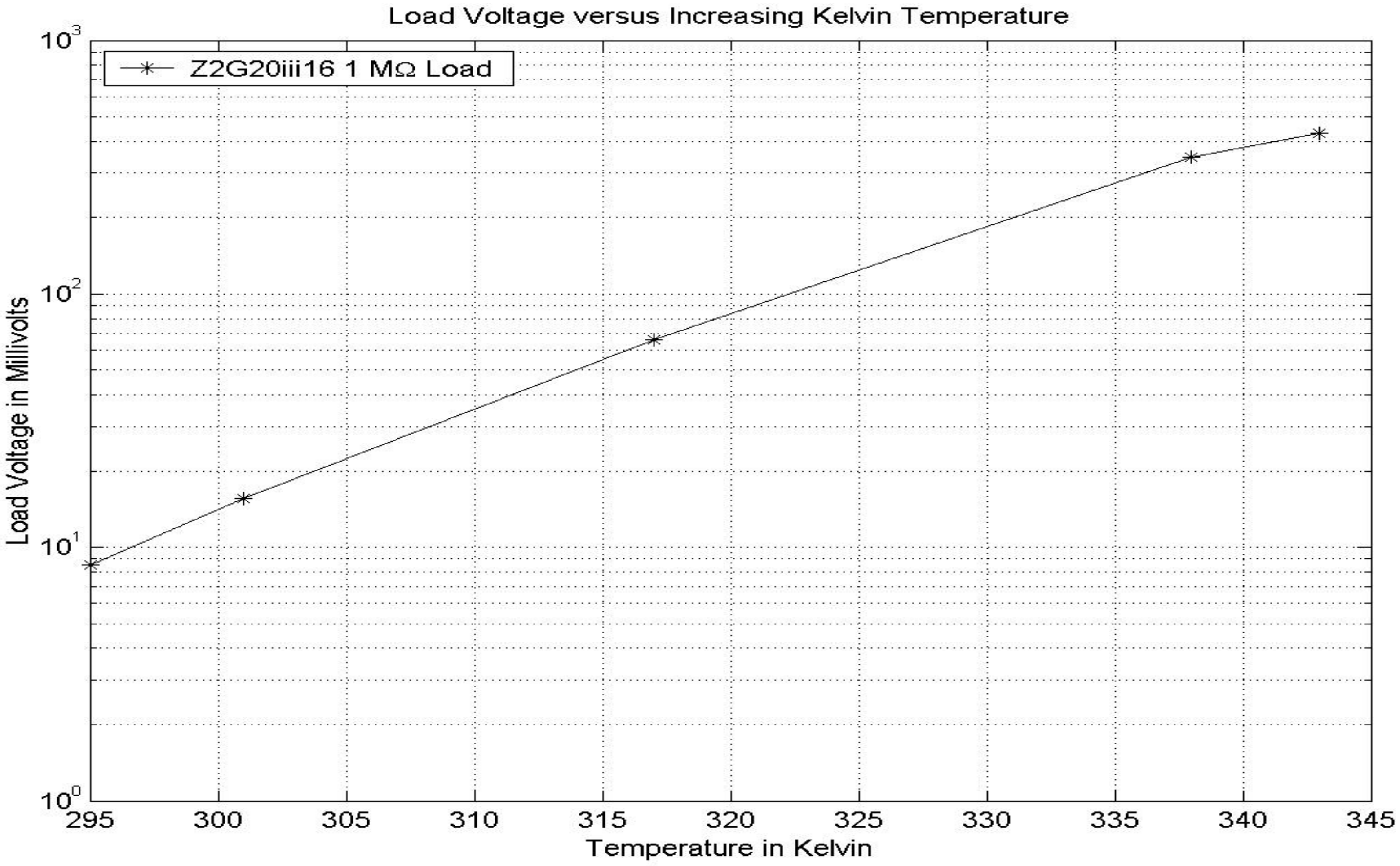
Plots the LEC voltage vs. time for different external load conditions.



~ 12 Second Steps
26 May 2020

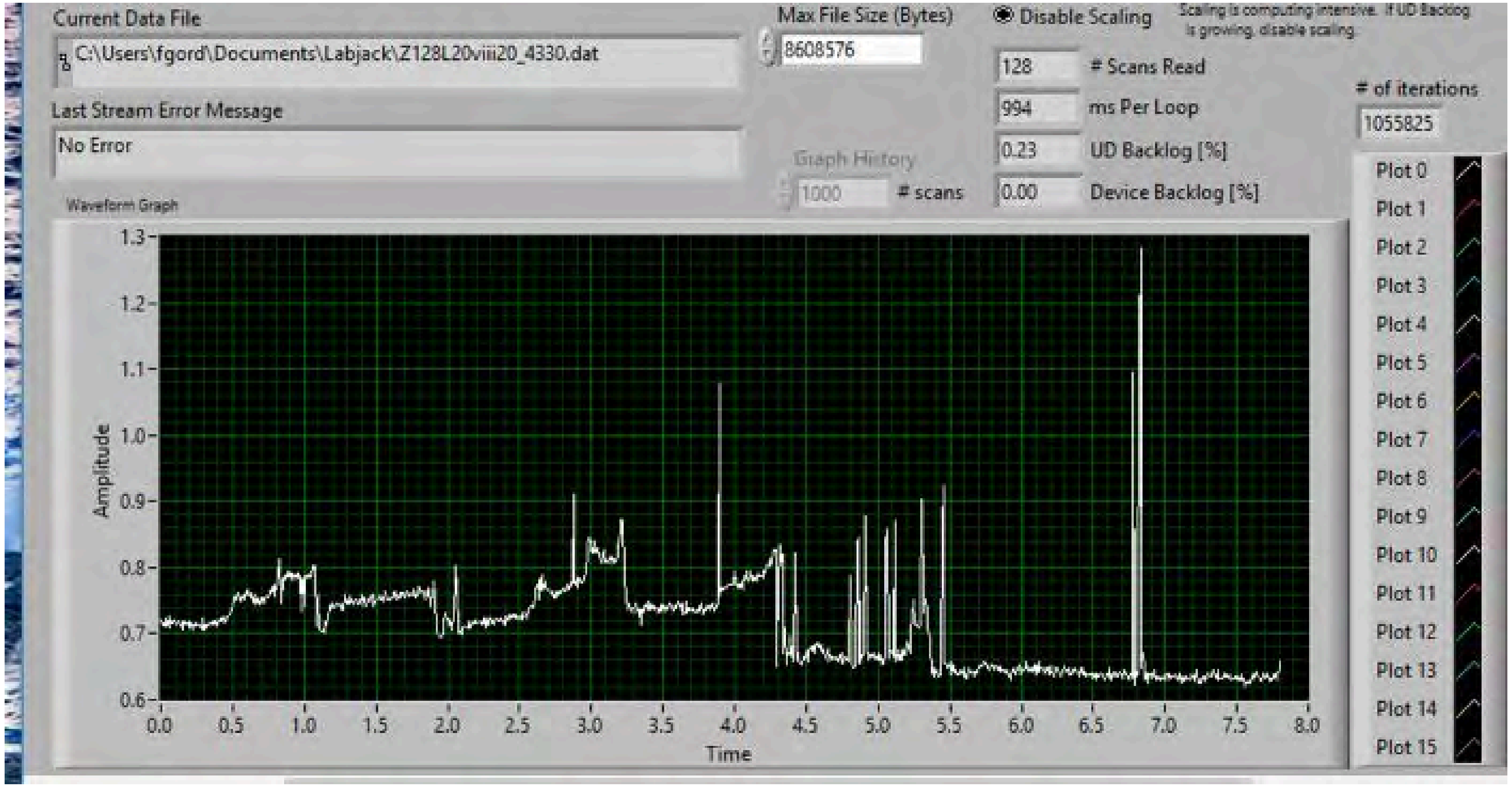
128 Samples/s

LEC Cell Voltage vs. Temperature



Print Screen Showing Spikes

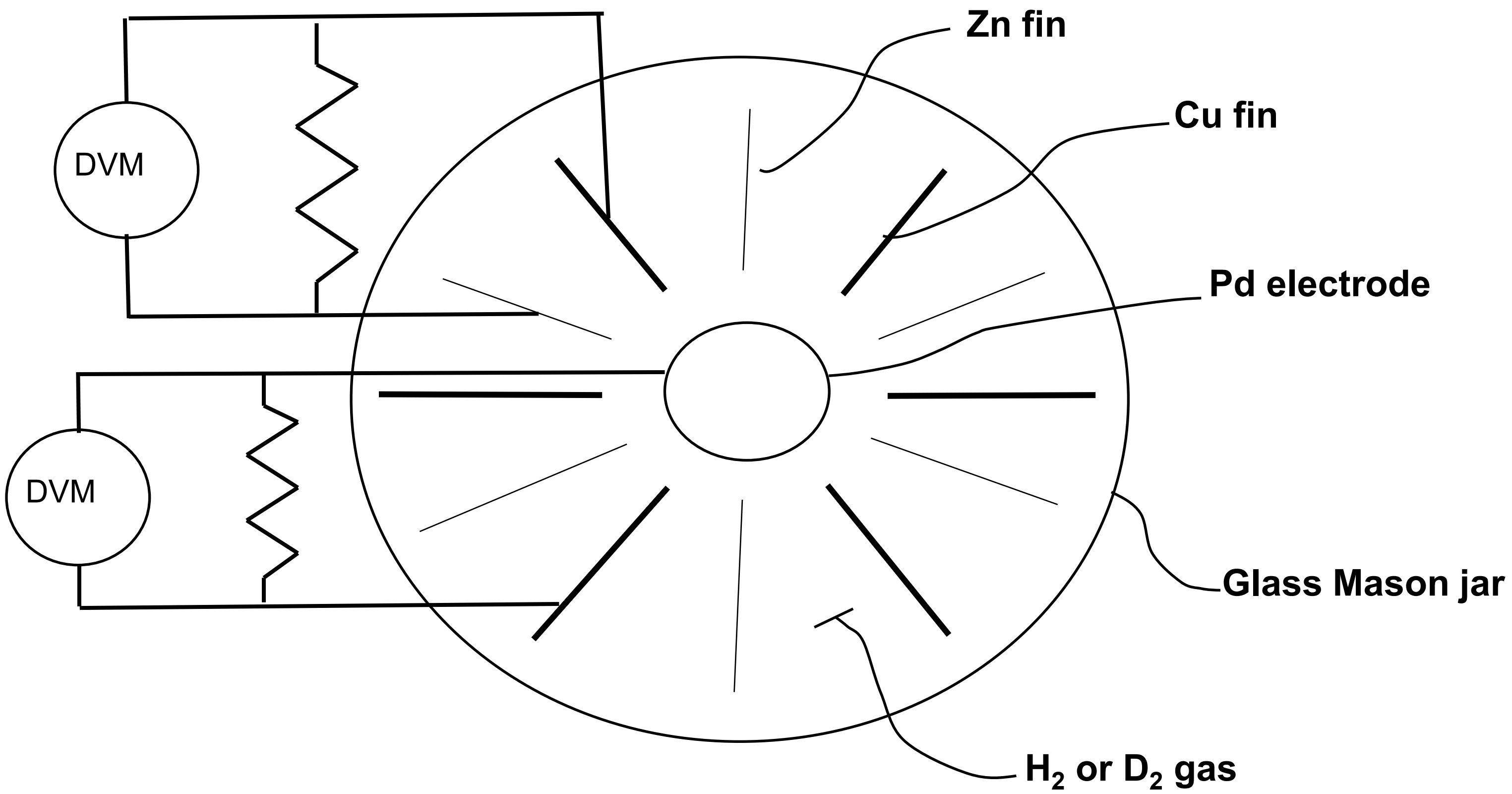
recorded at a sample rate of 128 samples per second



LabJack records up to 14 channels of data at sample rates up to 1000 S/s which is analyzed within one to four minutes depending on sample rate

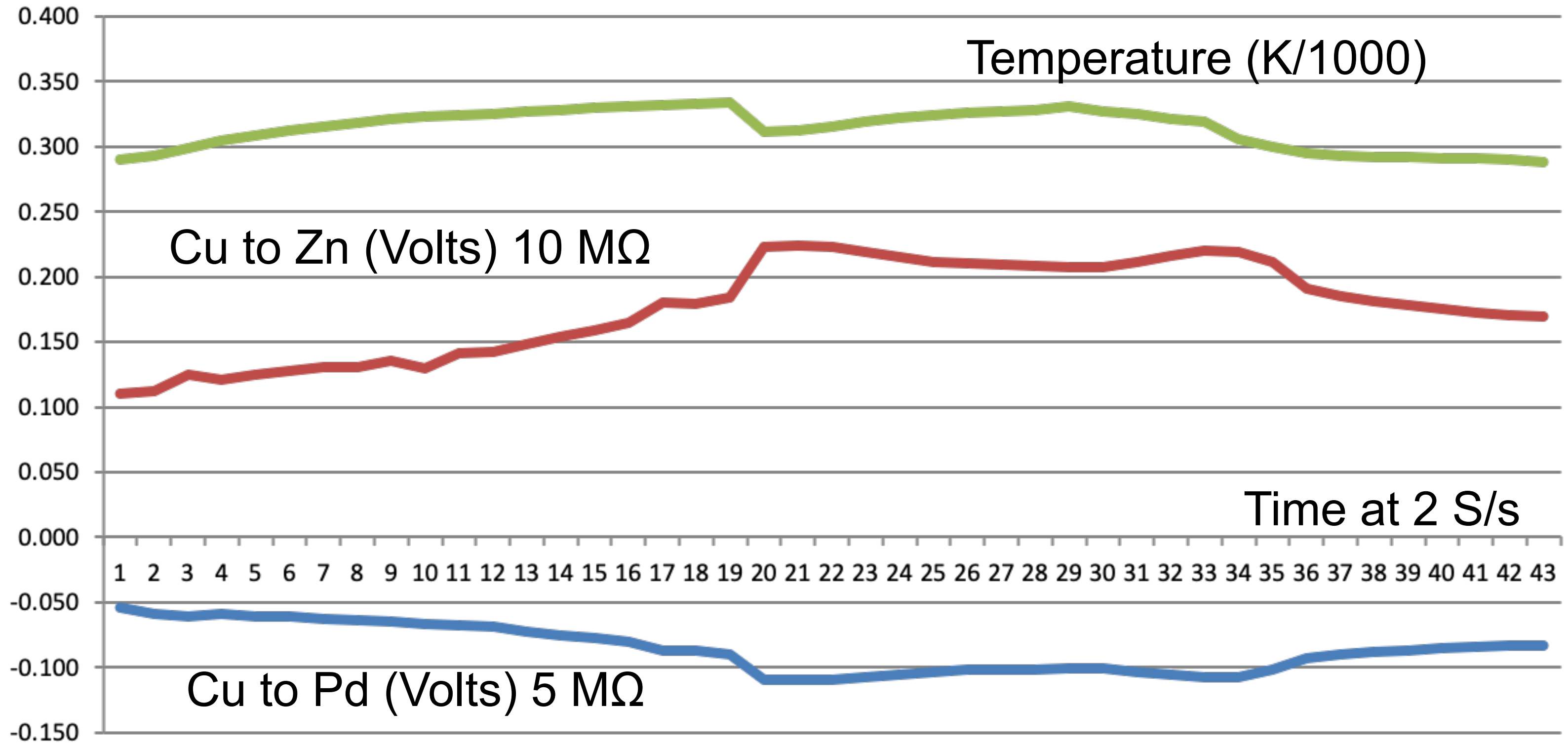
Alternative LEC Cell Design

A cross-section view of a contact potential difference cell with fin structures of different work function to harvest the energy.



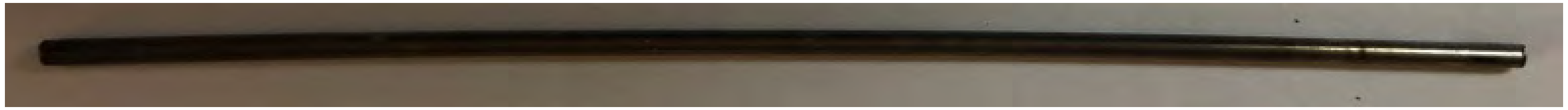
Alternative Cell Design Voltages

Plots of the spontaneous LEC voltages between the fins and the 'active' electrode in a cell configured as shown in the previous slide.



Extraordinary Claims Require Extraordinary Evidence

Replication by Jean-Paul Biberian



LEC cell self-initiated and self sustained the production of 300 mV and then 500 mV

CONVERSION DIRECTE: REPLICATIONS

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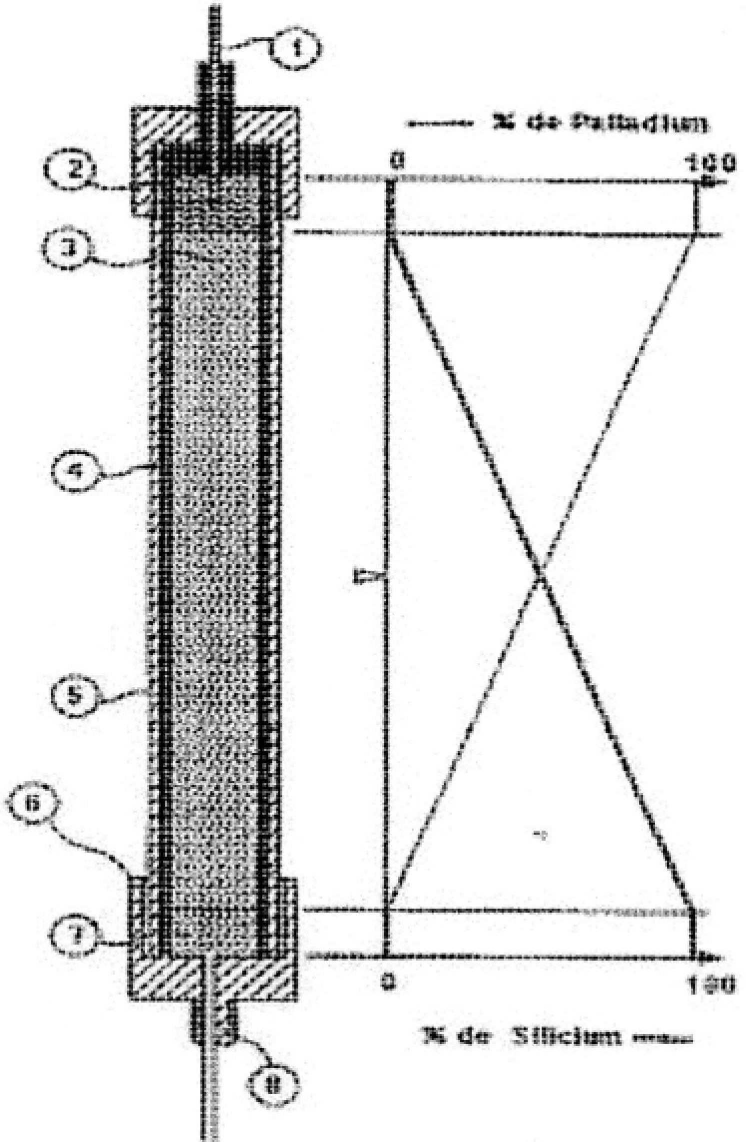
RNBE 2020 21 novembre 2020

FUSION DIODE : variable mix of Pd and Si powders along a tube

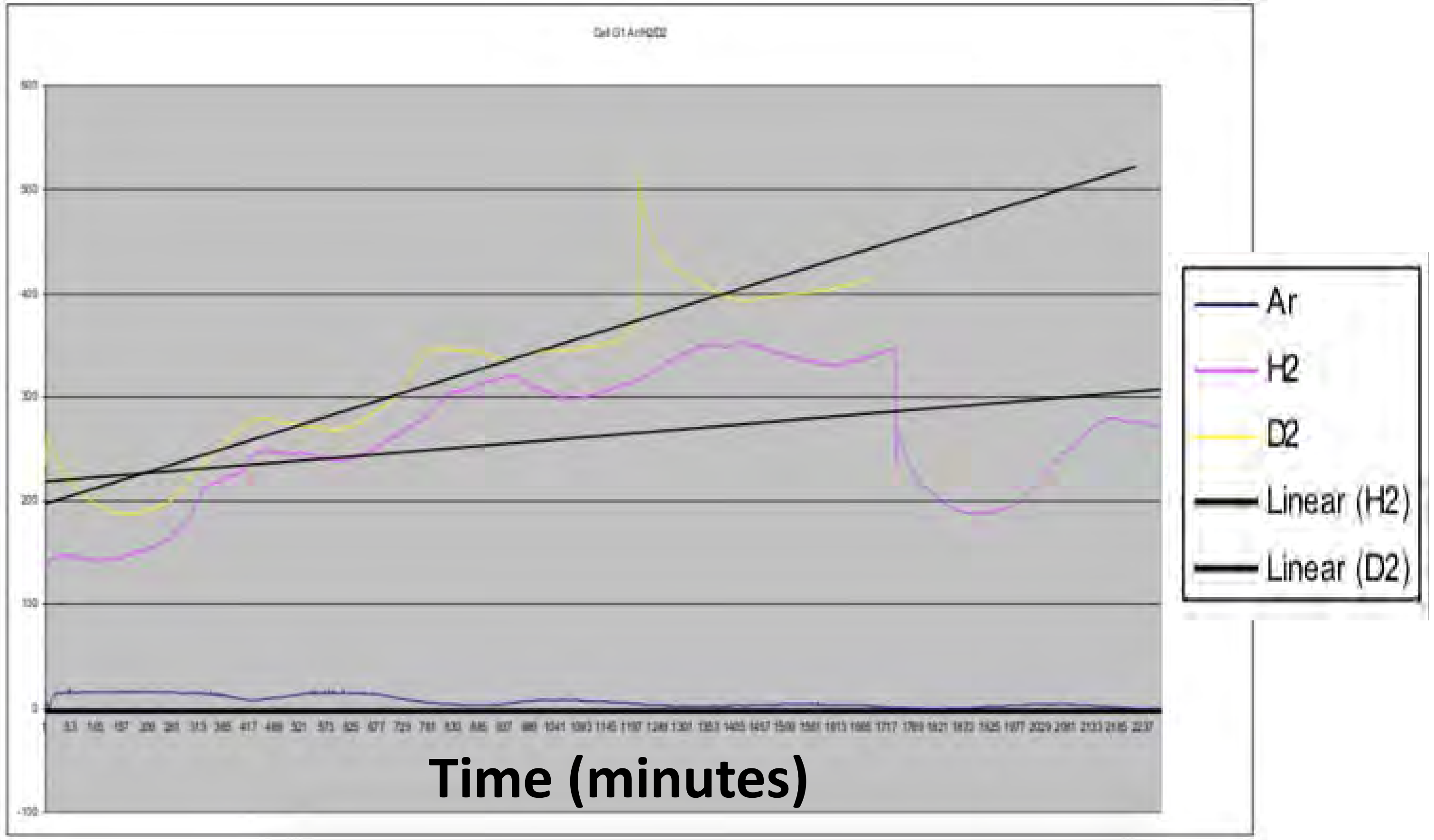
1 -Electrical connection.
2 -End cap, with threading.

3 -Mix of silicon and palladium powder.
  -At the bottom : pure palladium, and then
   an increasing concentration of silicon.
  -At the middle of the diode : 50% silicon, 50% palladium
  -At the top : pure silicon
  -The result is a very large surface rectifier diode.
4 –Inner plastic tube for insulation
5 –Aluminium container
7 -End cap
8 - Valve



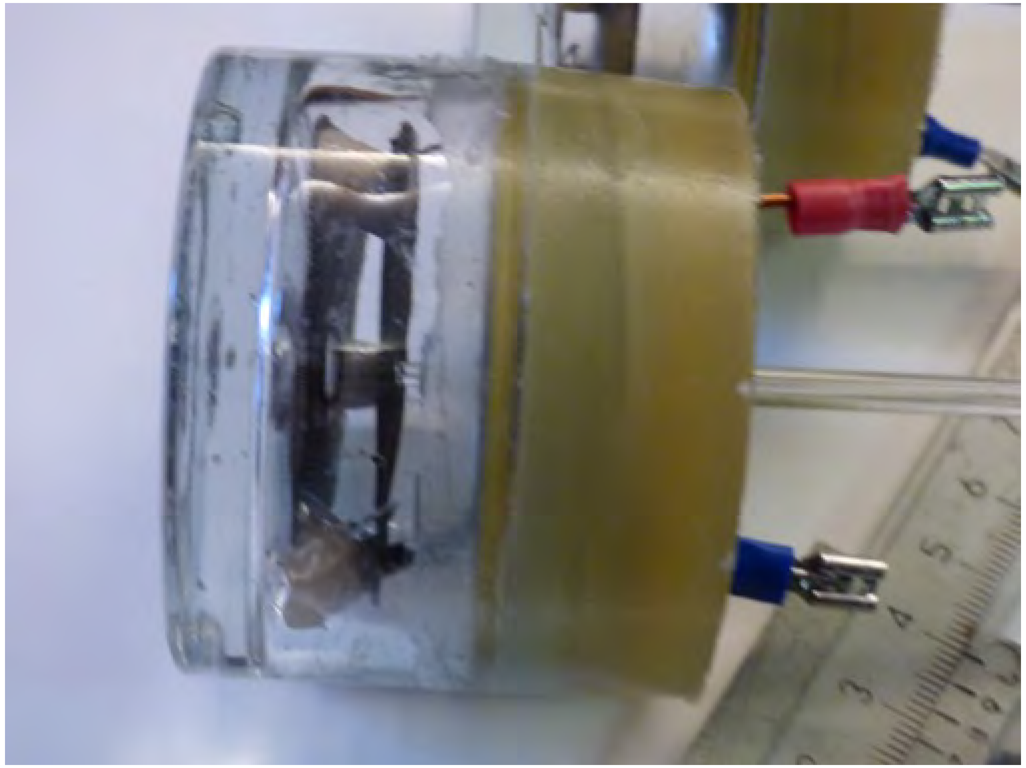
FUSION DIODE

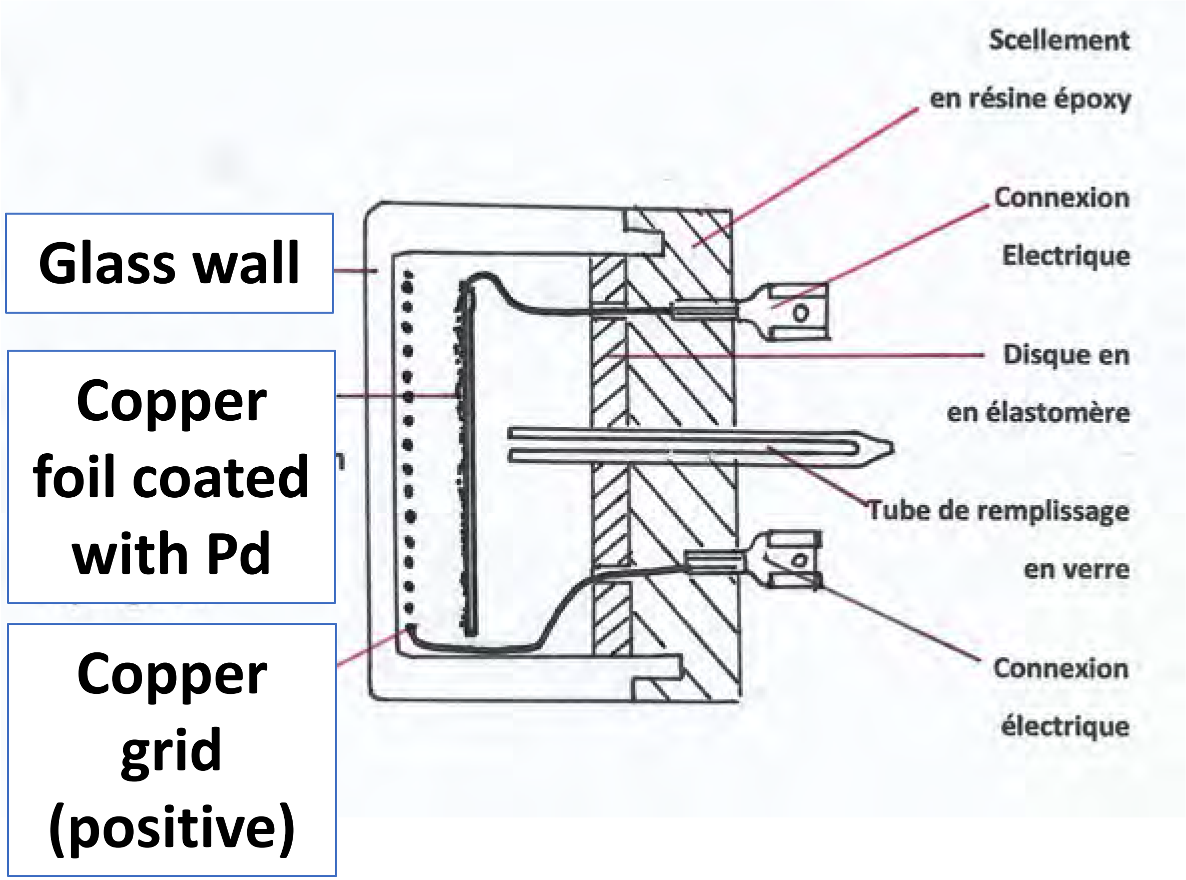
Spontaneous voltage obtained in D_2 , less in H_2 , negligible in Ar
Some worked during several months



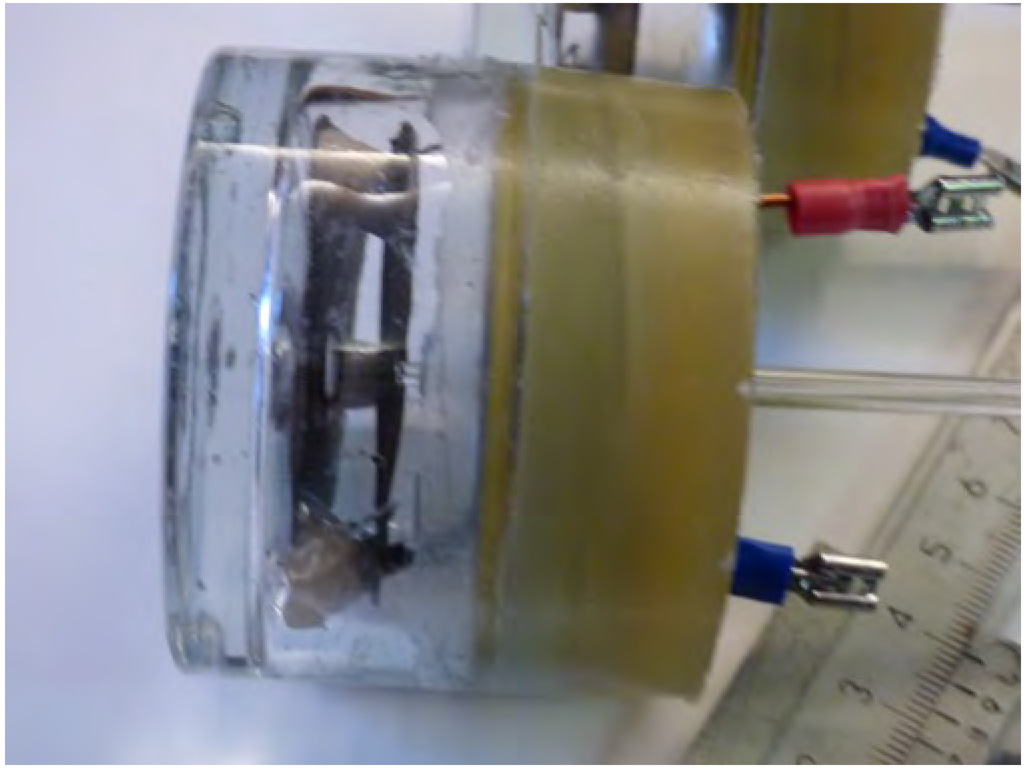
GAS CELL

Spontaneous voltage of 50mV in H_2

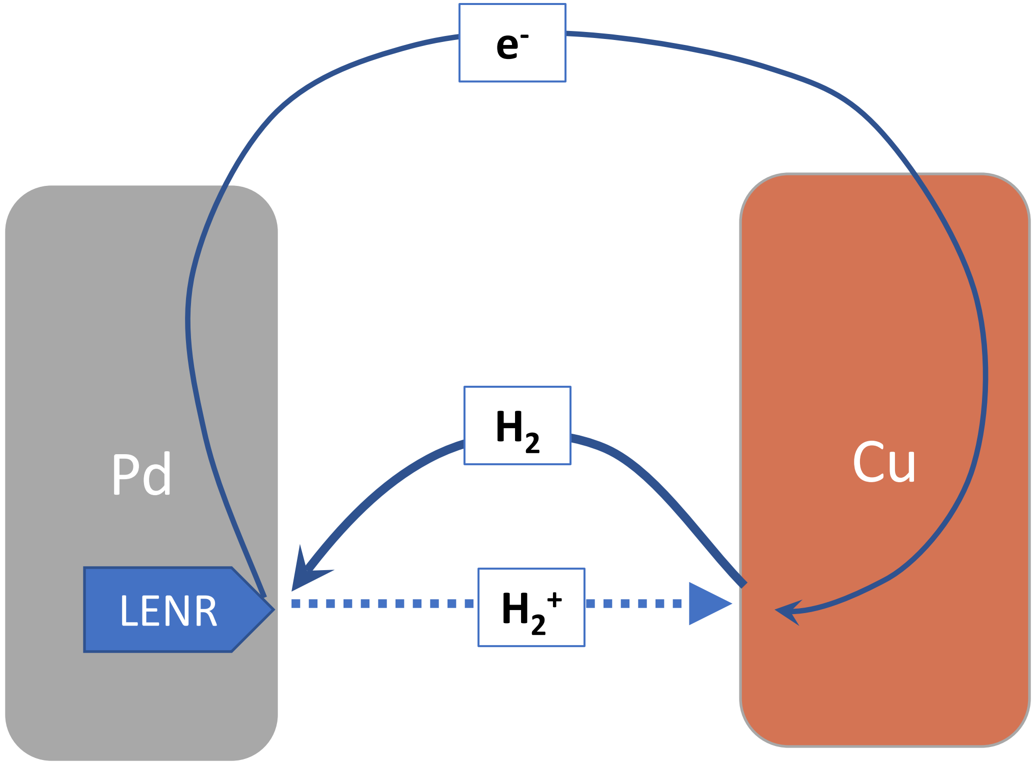




GAS CELL



Proposed explanation



Etudes expérimentales menées par l'Institut Louis de Broglie

Experimental studies by Institute Louis de Broglie

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Gaëtan de Lacheze-Murel[1,2]

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Introduction

- Georges Lochak proposed in 1984 an equation to describe a lepton monopole
- Leonid Urutskoev made experiments with electrical discharges in water and detect a particle which could be a leptonic monopole
- Collaboration between ILB and Ecole Centrale de Nantes
- Experimental setup to study discharges in water

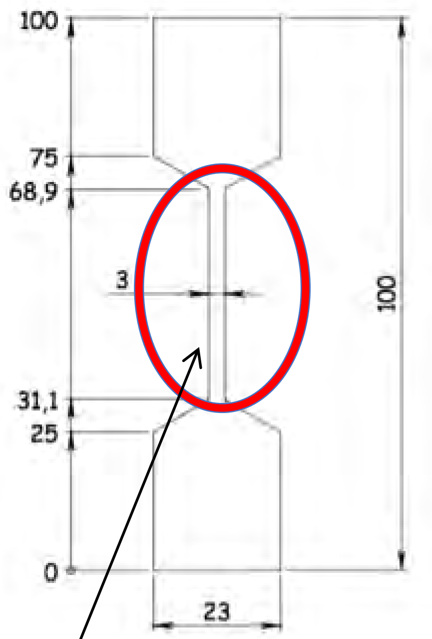
Explosion of a titanium wire in water(Ecole Centrale de Nantes)

Sonde de tension

Pot de tir

Collecte du gaz après avoir fait le vide dans le pot

Geometry



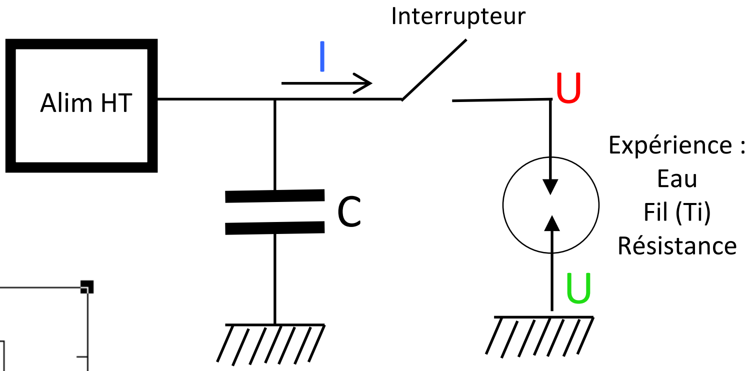
Zone du fil de Ti qui explose

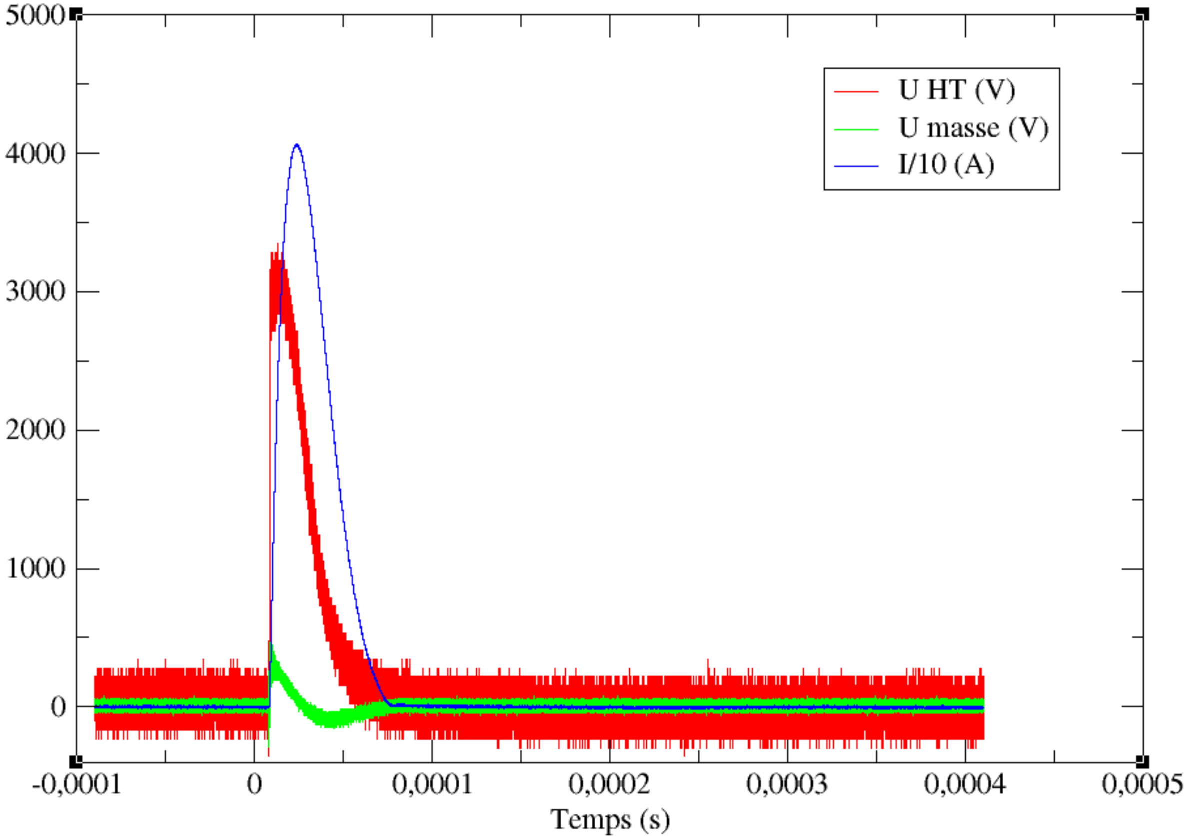
The Ti wire is placed in a polyethylene container with 18g of water

Water – gas – oxides are collected

Collaboration with Ecole Centrale de Nantes : Caractéristiques du banc électrique

Capacitor Bank : 400 µF,
Voltage: 1 - 7 kV => Energy = 200 - 10000 J

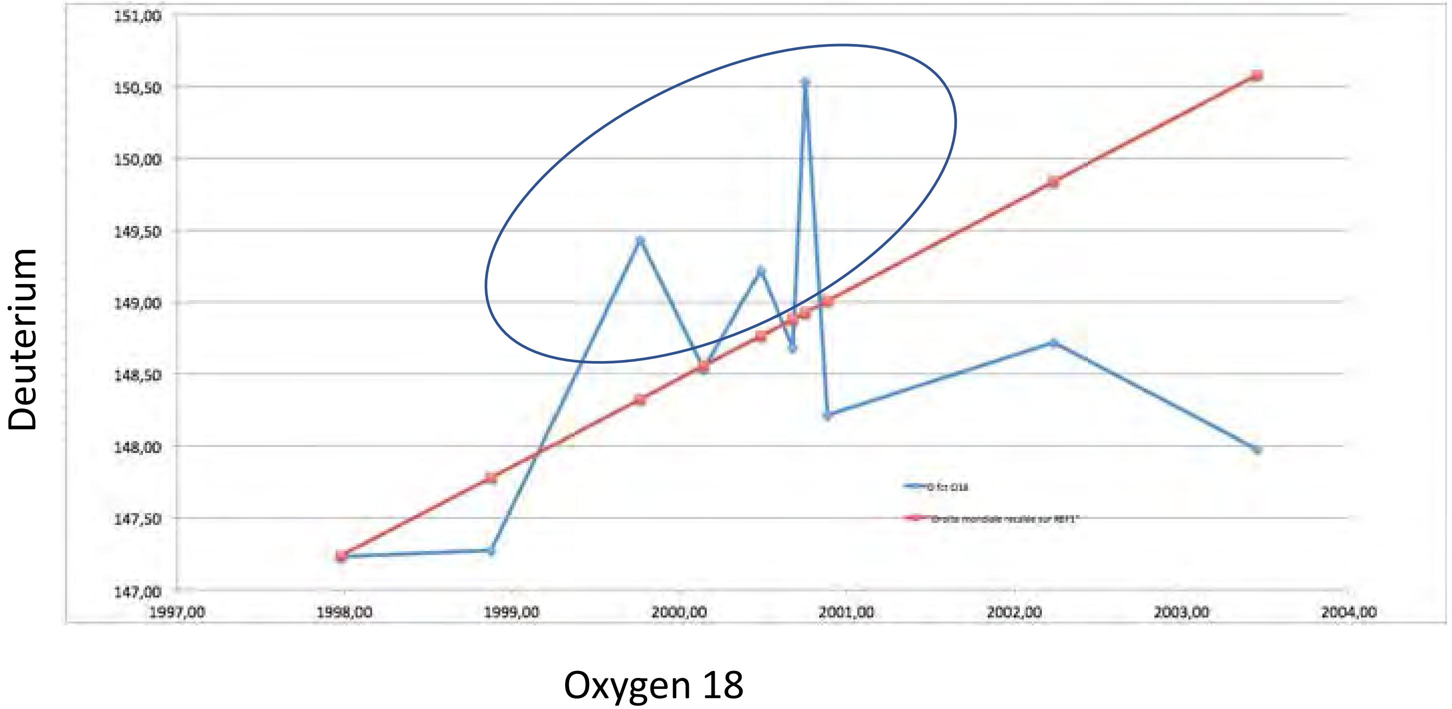




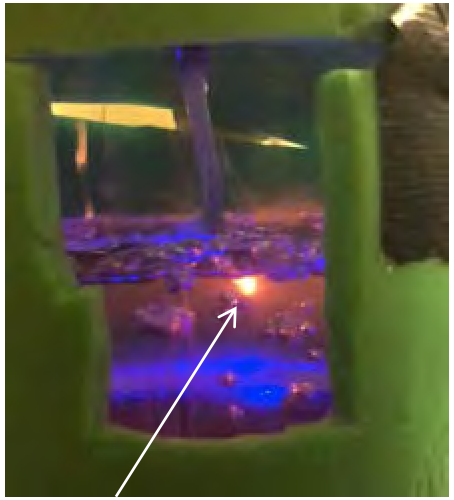
R = 50 mΩ
I max : 40000 A
U max : 3020 V
Charge totale : 1.3 C
Durée : 80 µs
Energie : 2220 J
Puissance max : 0.1 GW

The red curve shows the relationship between D and ^{18}O on planet Earth
Variations in natural waters are due to enrichment via evaporation

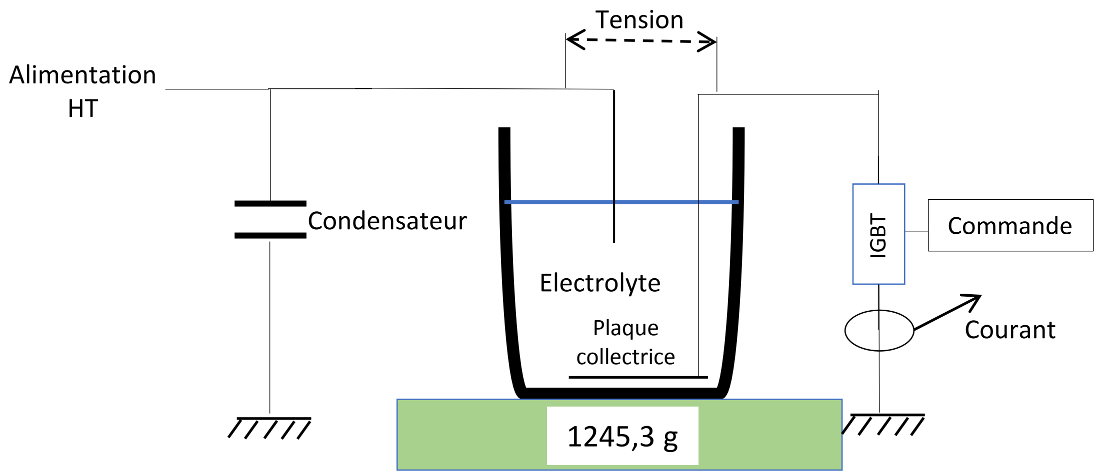
The blue curve shows the results obtained. Values above the red line indicates a creation of deuterium



Electrical discharges in water at ILB



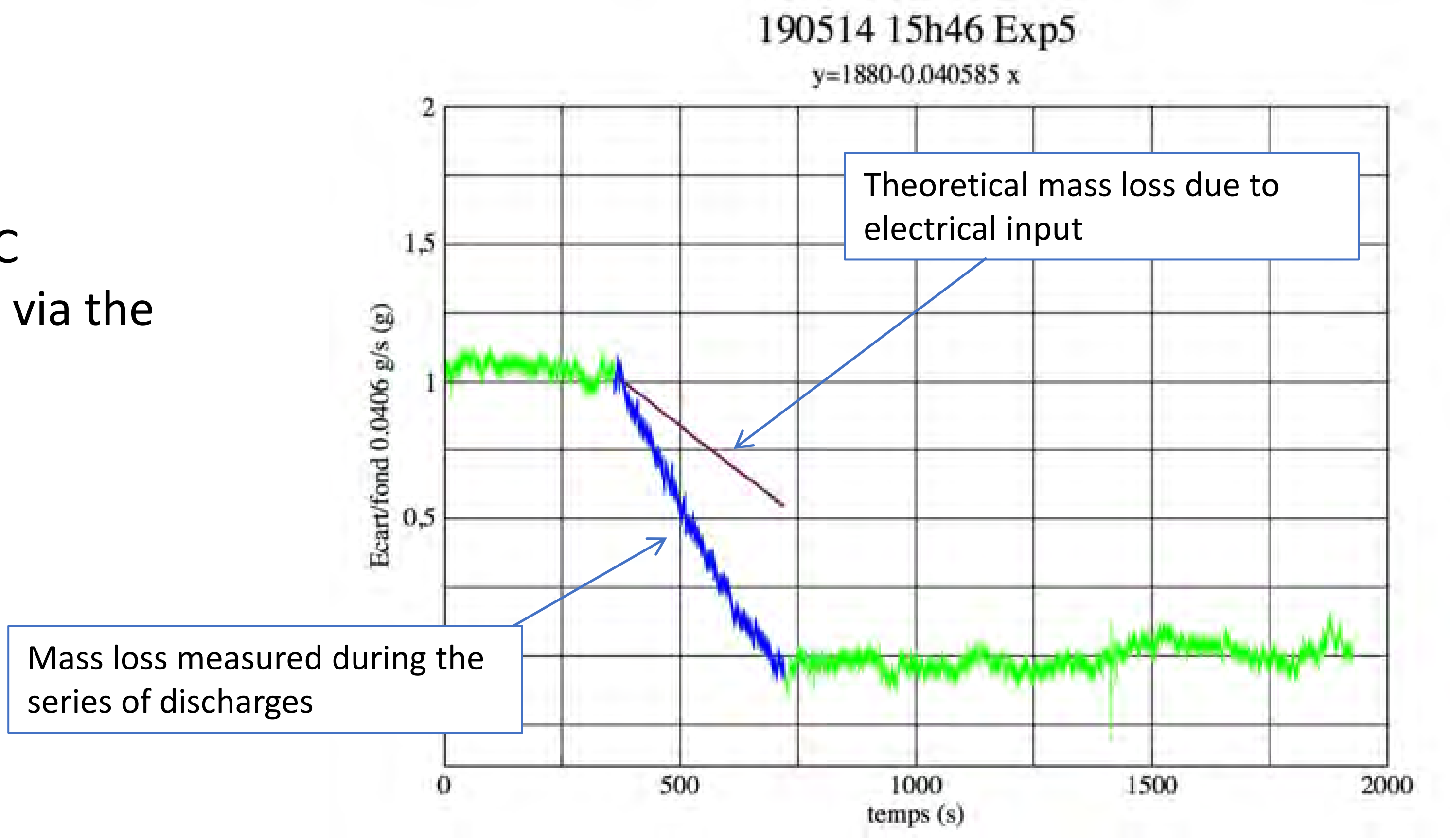
Plasma autour de l'électrode lors de la décharge



Capacitor : 350 µF.
IGBT switching a few µs to 100 µs
NaOH ≈ 0.5 Mol/l

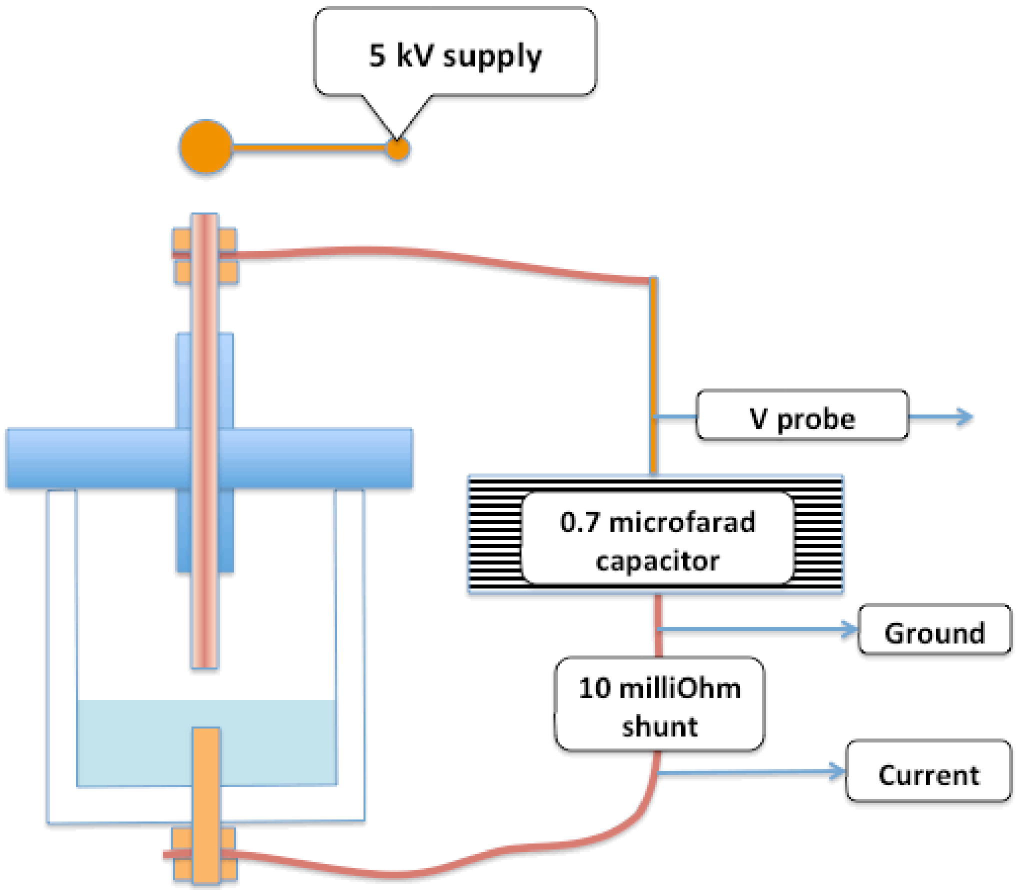
Energy measurements

Experiments made at 100°C
Energy output is measured via the water evaporation rate



In this run the output energy is 1.9 times larger than the electrical input

Experimental setup by Jacques Ruer to study Water Arc Explosions



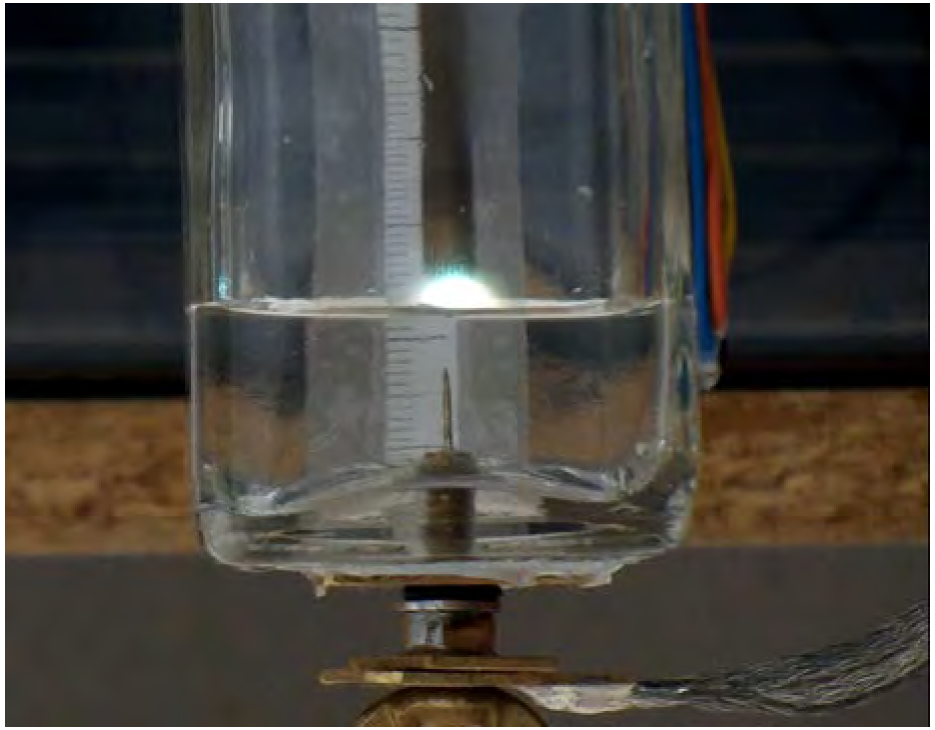
- Use of an oscillating electrode
- No switch
- Capacitor bank isolated from the supply during the discharge

Experimental setup

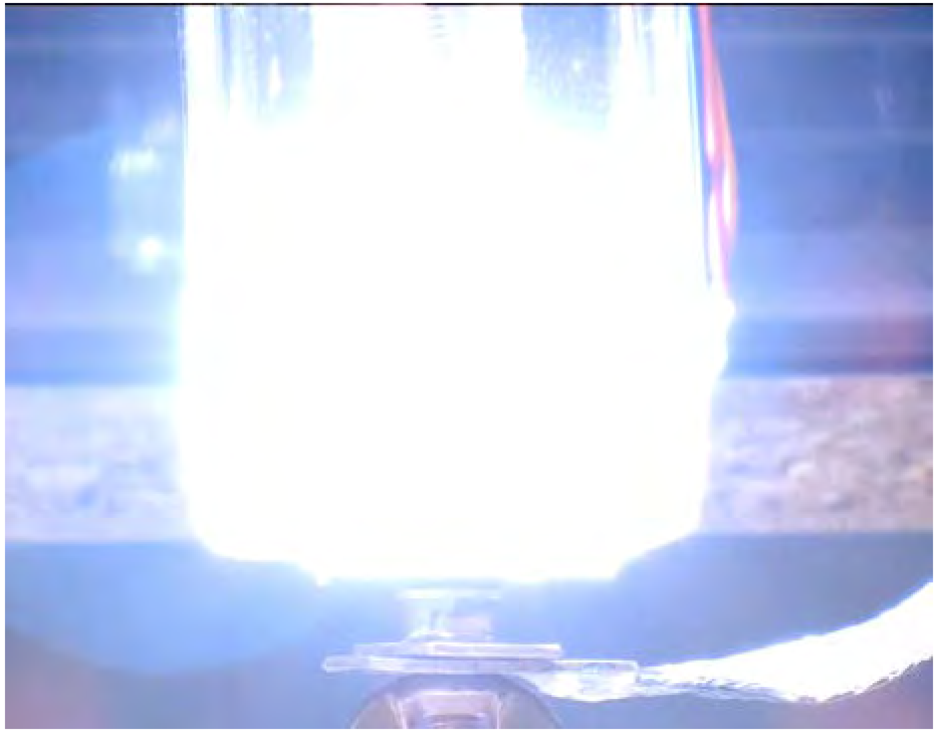
- Several electrode configurations tested
- Not all discharges produce a Water Arc Explosion

Comparaison

- Normal Arc



- Water Arc Explosion



- When a WAE occurs, the explosion is loud, the water is violently agitated