Cold Fusion or LENR

Low Energy Nuclear Reactions

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- History of LENR and Cold Fusion
- Situation today
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Niels Bohr: ‘Don’t publish that you have found excess heat’

There is more energy produced than used...
History: 1983

Stanly Pons & Martin Fleischmann

Inventers of LENR and Cold Fusion

They measured the following details

• Electric values
• Calorimetry heat balance
• $\gamma$ radiation and neutron flux
• Development of Tritium and Helium

• Conclusion: Nuclear reactions must be taking place.
History: Pons en Fleischmann 1989

- They published their results under pressure in 1989. All major media covered it.
- Many labs tried to reproduce their findings … but ‘no’ results.
- After only 3 month a conference was held, they were accused of fraud and CF was degraded as a ‘Pseudo Science’
- During 20 years the media hardly published anything about Cold Fusion, however....
- Small groups of scientists continued testing in e.g. Italy, the US, Japan and Russia.
History: Rossi 2011

- E-Cat produces 10 kW during half a year
- Operation based on an invention of professor Piantelli: the Ni-H reactor.
- Rossi worked with emeritus professor Forcardi.
- COP = 6.
- At that moment is it not tested independently.
- Rossi sold an 1MW plant to a ‘military customer’ in October 2011.
History: Rossi is not the only one:

**Defkalion** (Greek company)

- Has Rossi’s knowhow ‘taken over’ and said they are making a unit called ‘Hyperion’ that can produce 5-45 kW of heat. (2012).

- They moved to Canada but nothing was heard from them since 2015. Probably stopped due to finance issues.
Historie: Rossi is not the only one:

**Brillouin (USA):**

- They say they can start and stop their HotTube reactor at any wanted moment. It produces heat and (small quantities) of helium.
- The principle they have developed is called ‘Controlled Electron Capture Reaction’
Historie: Rossi is not the only one:

**NANORTECH**

- Professors Peter Hagelstein and Mitchel Swartz (both MIT) developed the Nanor
- COP: 80 (max)
Historie Rossi: Hot Cat tests

2014

- Al2O3 closed tube
- 2cm diameter 20 cm lang
- Contained 1gr fuel: Ni powder, LiAlH4 powder, lithium and some other substances
- The test was done by Swedish and Italian scientists in an facility in Lugano and took 32 days
History Rossi: 2014 Hot Cat test

Observation of abundant heat production from a reactor device and of isotopic changes in the fuel

Fig 13 expanded to show the Ragone plot of Pu-238 and the eCat test, March 2014

History Rossi: 2014 Hot Cat test

Analyse of the fuel: % Shift in isotopes

- Except $^{62}$Ni all Ni isotopes seem to have disappeared.
- The $^{6}$Li level seems to increase and $^{7}$Li to decrease in comparison to each other.
- This is only possible due to nuclear reactions!
In 2015 Replication attempts

Alexander Parkhomov

Source: lenr.seplm.ru
In 2015 Replication attempts

MFMP
Martin Fleischmann Memorial Project

MFMP GlowStick GS5.2 Reactor

Thermocouple Type K

Swagelok cap

Heater coil Kanthal A1 18 gauge 140 turns 9.6 ohms

Fuel: Hunter AH50 Ni 0.80 g
LiAlH4 0.15 g
Li stabilized 0.10 g

Cell tube Coorstek Mullite 0.375” x 0.187” x 12”
Heater cover tubes .995 alumina 0.750” x 0.500” x 3”
Filler rods 316L SS 0.178” OD x 2.6” long
Fuel volume 1.00 ml. 0.154” dia. X 2.5” long
Null volume 1.00 ml. 0.154” dia. X 2.5” long
Fuel capsule 316L SS 0.178” OD X 3” long
Vented set screw 8-32 unf x 3/16”
Alumina felt 3/16” dia. x 1” long

Power Drive +

Power Drive -

Pressure transducer 150 psi

T Fitting 2.2 ml. dead volume

Swagelok 22RS4 Metering Valve

Gas/Vacuum Manifold
1 MW steam generator Rossi/IH

Assembling 1 MW unit 2014

Rossi checking the 1 MW unit 2015
Theories

- Rossi/Cook: Quantum State Li: $^7\text{Li} + ^1\text{H} \rightarrow ^8\text{Be} \rightarrow 2(^4\text{He})$
- Widom-Larson: $p + e \rightarrow n$; Ultra slow neutron: $n + ^1\text{H} \rightarrow 2\text{D}$
- Storms: Nuclear Active Environment (NAE)
- Gullström: ‘Neutron tunneling’
- Dubinko: ‘Discrete breathers’ & $\text{H} \leftrightarrow \text{H}_2$ oscillations
- Piantelli: Fusion with $\text{H}^-$ Anion
Features of LENR (when Rossi is right)

- Energy density between 500,000 – 1,000,000 times higher than gasoline
- Power density around 5000 times higher than gasoline
- It can be made such that it emits no radiation
- No pollution. A LENR reaction produces e.g. helium out of lithium or nickel transmutes to copper.
- It produces high quality heat (up to 1600 °C) and also electricity and light.
- The fuel is extremely cheap and abundant
- If you know how to do it every technician can make his own reactor and it will be extremely simple and cheap.
Applications of LENR

- Abundant and cheap production of energy for:
  - Space heating
  - Production of sweet water
  - Local generation of electricity, maybe in combination with heat for domestic and industrial usage.
  - Very compact ‘atom batteries’: “life-long battery included”

- Transmutation of matter e.g.:
  - Reduction of radio active waste (patent Mitsubishi)
  - Production of rare material like gold and other precious materials
Expected Future

- It is hoped that ‘Rossi say’s’ will become reality in 2017 and we will see a breakthrough of LENR. These are some of the consequences:
  - A ‘Paradigm change’ in the world. This may happen relatively fast. Energy projects will be stopped. (Power stations, wind mills, ITER, hydroelectric plants, etc.)
  - Many new companies will come, but also many will be closed (like in the energy sector).
  - Research (LENR and physics) programs will be established which will lead to LENR improvements and new applications.
  - There will be a new world order. (Possession of an energy source will have no value anymore and no reason to fight a war).
  - Danger: The high energy density of LENR may destabilize the world. (Military usage).
  - Danger: The economics of many countries will be disrupted.
- LENR should be introduced slowly to avoid chaos in the world.
The most up-to-date LENR links:

- E-catworld.com
- egooutpeters.blogspot.nl
- lenr-forum.com
- Lenrproof.com