Scientific and Practical Questions about Lattice-Enabled Nuclear Reactions

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Motivations

Questions often drive scientific research.

There are several significant and basic LENR questions, which are not getting attention.

LENR questions are needed for program planning.

New LENR experiments are needed.

Earlier article in Infinite Energy Issue #84 (2009):
“Questions and Answers about Lattice-Enabled Nuclear Reactions”
Q: Is there only one, or more than one, basic physical mechanism active in LENR experiments to produce the diverse measured results?

There are many types of chemical reactions.

Of all the theories for LENR mechanisms, what compels us to think that it is a “winner take all” situation?

Might the appearance of various LENR products be due to the operation of various mechanisms?
Q: Is there only one, or more than one, basic physical mechanism(s) active in LENR experiments to produce the diverse measured results?

Q: Is excess heat from electrochemical and gas loading experiments due to the same basic mechanism(s)?

Is there any empirical evidence for the same mechanisms producing energy with both methods of loading?

Potential experiment: Use the same materials in both electrochemical and gas loading experiments.

Cylindrical rod, maybe covered with nanomaterials

Use as cathode and as the material in a gas experiment
Q: Is there only one, or more than one, basic physical mechanism(s) active in LENR experiments to produce the diverse measured results?

Q: Is excess heat from electrochemical and gas loading experiments due to the same basic mechanism(s)?

Q: Do LENR occur exclusively as individual uncoupled events, or is it possible to have cascades of LENR, in which one reaction makes more likely the occurrence of additional LENR?

**Q:** Is the excess heat due only entirely or only partially to nuclear reactions?

There are theories that involve formation of “compact objects”: Dufour, Heffner, **Mayer & Reitz**, Meulenberg & Sinha, & Mills.

- Binding Energy = 3.7 keV
- ~400 fm

![Diagram of nuclear reactions and energy levels](image)

- Normal Atom (Blue): Long distance to tunnel
- Muonic Atom (Green): Short tunneling distance

\[
E_T = N_C\{E_C + \sum f_N E_N\}
\]

with \(E_C \ll E_N\)

- Potential Well due to Strong Force

D. J. Nagel & R. Swanson

ICCF-18
Q. Do LENR occur on or near surfaces or in the bulk of materials or in any locations on or in a material?

Surfaces usually are covered diverse layers, which are usually complex in both their composition and structure. The layers can be enabling or disabling.

Bulk

0 D Point Defects
Vacancies
Impurities
Interstitials

1 D Dislocations
Edge
Screw
Other

2 D Boundaries
Twins
Grains
Phases

3 D Particles
Voids
Phases
Other Materials
Q. Do resonances of any kind (electrical, mechanical or chemical) play a role in causing LENR?

McKubre et al, Proc. of ICCF-5, 1995

T. Zilov et al, Proc. of ICCF-11, 2004

Need other tests of McKubre’s equation to verify that it captures all of the relevant variables.
Q. What are the roles of electrical, magnetic, electromagnetic, ultrasound and other applied fields in LENR experiments?

Scott R. Chubb and Dennis G. Letts
“Magnetic Field Triggering of Excess Power in Deuterated Palladium”
ICCF-16 (2011)

Also see M. Swartz
“Impact of an Applied Magnetic Field on a High Impedance Dual Anode LANR Device”
Q. What is the role of sudden thermal changes within electrochemical cells?

S. Pons, M. Fleischmann, C. Walling and J. Simpson
Planned Articles for Infinite Energy Magazine


Scientific Questions on Lattice Enabled Nuclear Reactions: Experiments, Theories and Computations. [#118 Nov-Dec 2014]

Practical Questions on Lattice Enabled Nuclear Reactions: Engineering and Applications. [#119 Jan-Feb 2015]