LENR Catalyst Identification Model

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Many Low Energy Nuclear Reaction (LENR) processes are now well known and well documented. LENR processes typically involve the use of specific catalysts to achieve transmutation and/or excess heat. Models previously proposed to explain LENR processes (Widom Larsen, hadrionic, hydronion, shrunken H, etc.) provide many insights into LENR processes, but do not yet provide a theoretical method for identifying catalysts.

Early (1980's) excess heat observations also resulted in alternative non-nuclear explanations, such as the potential for below ground state hydrogen (Mills, 1980's) [1]. Below ground state hydrogen theory is particularly interesting as it can provide a theoretical basis for catalyst identification, via an extension of the Rydberg equation to below ground state. While aspects of the Mills theory can explain excess heat observations, overall the theory remains inconsistent with transmutation observations, and consequently LENR. We do however, need to be careful not to "throw the baby out with the bath water". By adopting a first principles below ground state hydrogen model, significant progress is possible in developing a theoretical basis for LENR catalyst identification.

Re-examination of the Rydberg Excited State Model

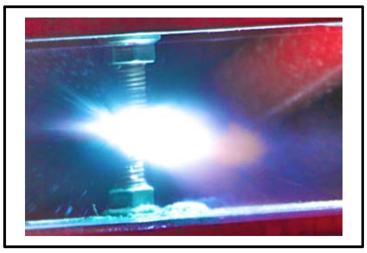
The Rydberg model for the excited states of hydrogen allows transition energies between various states to be theoretically determined, and also poses a size relationship between excited states based on the 'n' variable. The Rydberg excited state size relationship is 'ground state' centred, with excited hydrogen state sizes all being linear multiples of the ground state size.

If we remove 'ground state' centricity, an alternative excited state size model can be identified where each subsequent excited state of hydrogen, n+1, is twice the size of the previous excited state, n. The model can then be extended to below ground states, with each subsequent de-excited state, 1/[n+1], being half the size of the previous state, 1/n.

Why is a Modification of the Rydberg State Size Model Important for Understanding LENR?

The new hydrogen state size model proposes that below ground states of hydrogen are significantly smaller than ground state, for example: $n = 1/5$ will be 2^5 times (i.e. 32 times) smaller than ground state hydrogen. For smaller excited states, (i.e. $n < 1/10$), size approaches that of the larger nuclei.

Various de-excited "small hydrogen" states are expected to be consistent with the characteristics of "small hydrogen" frequently considered to be a vital component of LENR processes. Most importantly, transition energies for the formation of these below ground hydrogen states can now be determined by a first principles extension of the Rydberg equation to de-excited states, noting that some calibration of the theoretical transition energies may still be required.



Photograph - Nickel based LENR Reaction

Testing is in progress to confirm the validity of the model. Details of testing, reaction photography, and list of potential catalysts are available at: subtleatomics.com

[1] Mills, R, 2016, Grand Unified Theory of Classical Physics, self-published ebook, available at brilliantlightpower.com, accessed Nov 2016.