Low Energy Nuclear Reaction Research at the Naval Research Laboratory

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We have explored the field of Low Energy Nuclear Reactions (LENR) for about eight years focusing on transmutation, electrochemistry, and gas loading with the latter two being the most fruitful. In electrochemistry, palladium foil is loaded with deuterium in a closed electrochemical cell contained in a calorimeter. Occasionally, excess energy is produced that is much larger than can be accounted for by chemistry or the electrical input into the system. Unfortunately, the poor reproducibility (<6%) prevented discovery of the trigger for this excess heat. In gas loading, palladium nanoparticles are pressurized with deuterium. While the resultant heat is very reproducible, it is much lower than from electrochemical experiments and therefore harder to characterize as unconventional chemistry. In both approaches to LENR only energy (as heat) is produced – neither nuclear products nor transmutations have been firmly established.

Science is data driven. Once a hypothesis is formed, the most important scientific task is to disprove the hypothesis. Only after failure to find conflicting data is a hypothesis accepted as likely correct, but that acceptance can change on a moments notice when new data arises. Although simple in concept, LENR experiments have subtle pitfalls to trap the more casual researcher, and much of our effort has gone into uncovering these pitfalls. Through a historical perspective, I will discuss the application of the scientific method to selected results and how incorrect conclusions could have been easily made. In contrast, we can find no artifacts to explain the data for some of our results, and therefore we must conclude that an unknown source of energy exists and is worthy of more attention.