

The Nature of the D+D Fusion Reaction in Palladium and Nickel

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The LENR reaction can be made to occur in Pd and Ni having different physical forms. The behaviors of solid Pd, sintered Pd powder, and sintered Ni powder are discussed.

The required deuterium ions can be made available to the LENR process using gas discharge, electrolysis, or exposure to D₂ gas. Results obtained using each of these methods are described.

Initiation of the nuclear reaction sometimes requires creation of a large D/Pd ratio, but not always. In many cases, very little deuterium is required to produce detectable power. In every case, the amount of power is not affected by the D/Pd ratio after the nuclear process starts. Also, increased temperature causes the amount of power to increase exponentially, with the activation energy being related to the source of deuterons available to the nuclear process.

The reaction involving deuterium emits part of the nuclear energy as energetic ions having the characteristics of a hydrogen isotope, not helium. Very little photon radiation is detected outside the walls of the container in which the source is located.

The behavior is consistent with the nuclear active environment (NAE) being in physical gaps having a critical width located outside the crystal structure, not in vacancies located within the lattice structure. Successful production of LENR involves formation of these sites in high concentration and with reliability. This paper describes an effort to meet this challenge.