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**Conventional Physics can Explain Excess Heat in the Fleischmann-Pons Cold Fusion Effect** SCOTT CHUBB, Infinite Energy Magazine — In 1989, when Fleischmann and Pons (FP) claimed they had created room temperature, nuclear fusion in a solid, a firestorm of controversy erupted. Beginning in 1991, the Office of Naval Research began a decade-long study of the FP excess heat effect. This effort documented the fact that the excess heat that FP observed is the result of a form of nuclear fusion that can occur in solids at reduced temperature, dynamically, through a deuteron ( $d+d \rightarrow \text{helium-4}$ ) reaction, without high-energy particles or  $\gamma$  rays. This fact has been confirmed at SRI and at a number of other laboratories (most notably in the laboratory of Y. Arata, located at Osaka University, Japan). A key reason this fact has not been accepted is the lack of a cogent argument, based on fundamental physical ideas, justifying it. In the paper, this question is re-examined, based on a generalization of conventional energy band theory that applies to finite, periodic solids, in which  $d$ 's are allowed to occupy wave-like, ion band states, similar to the kinds of states that electrons occupy in ordinary metals. Prior to being experimentally observed, the Ion Band State Theory of cold fusion predicted a potential  $d+d \rightarrow \text{helium-4}$  reaction, without high energy particles, would explain the excess heat, the helium-4 would be found in an unexpected place (outside heat-producing electrodes), and high-loading,  $x \approx 1$ , in PdDx, would be required.

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