Electron Quasiparticle Catalysis of Nuclear Reactions

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Abstract

We present a model based entirely on known, conventional physical chemistry, solid state physics and muon catalyzed reaction physics, the combination predicting both the isotopes observed and the lack of known energetic emissions for a set of proton-nickel and related reactions. The model unifies the observation of a new reaction type recently discovered in surface catalysis and the observation of the cryogenic, chemically-induced fusion reactions of muon catalyzed fusion. Unification depends on the use of a third, negative particle between reactants having an effective mass above a threshold. A solid state physics discovery provides a transient, elevated effective mass electron quasiparticle created by simultaneous addition of electron energy and lattice crystal momentum for placing the quasiparticles near an inflection point of the band structure of the material, where effective mass diverges. Observations suggest in every case of anomalous isotope and energy emission a mechanism appears to exist to add such crystal momentum and energy, sufficient to raise the effective mass above a calculable threshold. Applications include transmuting radioactive waste into natural elements.