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**Excess heat observed during electrolysis of deuterated phosphoric acid with palladium electrodes and a solid state electrolyte in deuterium gas** J.-P. BIBERIAN , CRMCN, Faculte des Sciences de Luminy,163 Avenue de Luminy, 13288 Marseille cedex 9, France, G. LONCHAMPT, CEA-Centre D'Etudes Nucleaire, Grenoble (retired); 31 Chemin Malanot, 38700 Corenc, France — We start with the hypothesis that the production of excess heat is occurring at the recombination  $H+H\rightarrow H_2$  gas. If the pressure of hydrogen at the time of recombination is high enough, nuclear reactions can occur. In the case of hydrogen  $H+H\rightarrow D+e^+$  and in the case of deuterium  $D+D\rightarrow He^{-4}$ . The high pressure can be obtained using Nernst's law, the potential between a hydrogen electrode and the cathode is given by  $E=E_o+RT\ln(\frac{P}{P_o})$ . There are two sources for the potential: the electrochemical potential which is a characteristic of the metal in the presence of the metal ions, and on the other side, the over-potential for the formation of the hydrogen molecules. In this study we use palladium anodes and cathodes, but the cathode is covered with a thin film of a metal having either a low chemical potential or a high over-voltage for hydrogen formation. When deuterium molecules form at the surface of the electrode, very high pressures can be produced during a very short period of time during which possible nuclear reactions can happen. We show that excess heat is observed with clean palladium foils, and more excess heat is produced when the cathode is covered by a thin, metallic film, constructed using one of many possible metals.

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