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**Material Science Developments Enhancing Excess of Power Reproducibility** V. VIOLANTE, M. BERTOLOTTI<sup>1</sup>, E. CASTAGNA<sup>1</sup>, M. MCKUBRE<sup>2</sup>, F. SARTO, C. SIBILIA<sup>1</sup>, F. TANZELLA<sup>2</sup>, T. ZILOV<sup>3</sup>, ENEA Frascati Research Center, Frascati (Italy) — Material science research activities have been carried out in order to increase the reproducibility of the excess of power production during electrochemical loading of palladium with deuterium. In the past a wide work was developed to obtain a metallurgical structure of the palladium able to ensure a significant loading of deuterium above the threshold of 0.95 (D/Pd atomic fraction). It was observed that the high loading of the Pd cathode with deuterium was a necessary condition to have the occurrence of the excess of power production. The more recent work was mainly oriented to optimize the material properties in order to have a significant improvement of the reproducibility of the excess of power. During the last campaign of experiments more than 50% of the experienced cathodes produced excess of heat ranging from 30% up to more than 100% of the input.

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