

## Chemical Heat Generation in LENR

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Over the past nearly 30 year history of LENR there have been a number of reports of explosions in experiments and other thermal events that many attribute to an LENR effect. However, before advocating LENR it is necessary to make sure that no prosaic chemical or physical reactions can explain, at least partly, the results observed.

This paper addresses 2 types of phenomena where chemical effects may have contributed to the events.

### 1- Abnormally strong detonations

During electrolysis of water a mixture of hydrogen and oxygen is produced that can accumulate in the headspace of the cell. Under some conditions, an explosion that is uncommonly strong can arise. Examples are the explosion event presented in 2014 by Jean-Paul Biberian at ICCF-17 in Korea or the explosion that occurred in 1992 at the laboratories of SRI International at Menlo Park, California. The strength of the detonation was such that it seemed logical to envisage the role of LENR to explain the powerful explosions. Further investigations made by the authors show that a particular phenomenon called SWACER (Shock WAVE Coherent Energy Release) can play a role. The effect has been reproduced. Examples are shown. Some safety advices to avoid such catastrophic explosions in the future are presented.

### 2- Self-heating of hydrogen loaded palladium cathodes exposed to the air

The potential chemical effects that arise in charging a palladium metal lattice with deuterium to such a degree that a latent chemical potential resides in the metal could theoretically contribute to vigorous heating effects. In particular, when a deuterium-loaded sample is exposed to air, combustion can occur. The chemical reaction increases the temperature. This accelerates the escape of the gas out of the metal, enhancing further the combustion process. If some b phase was present its dissociation contributes to the heating. A model of the temperature evolution during such a process is presented. The role of the different parameters is explored. It is shown that high temperatures can be reached.

The object of the paper is not to necessarily show what occurred in various events that have been observed over the years, but simply to open the possibilities of a contribution from chemical effects arising under the circumstances.