1. Title of Document: Spontaneous ignition of hydrogen Literature Review
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2. Prepared by:
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3. Prepared for: Health and Safety Executive
4. Date of report: 2008

5. Original Language of report: English

6. Abstract when available or summary (in English):

   This report is part of a project funded by HSE to investigate the phenomena of spontaneous ignition of accidental hydrogen releases. Over the years there have been reports of hydrogen leaks igniting for no apparent reason, and a number of potential ignition mechanisms have been proposed. Investigations of these ignitions have often been superficial, with a mechanism postulated which, whilst appearing to satisfy the conditions prevailing at the time of the release, in general does not stand up to rigorous scientific analysis. Some of these proposed mechanisms have been simulated in the laboratory under superficially identical conditions and appear to be rigorous and scientific, but the simulated conditions often do not have the same large release rates or quantities, mainly because of physical constraints of a laboratory. With the advent wide spread use of high pressure hydrogen storage for vehicles and other applications there is a clear need to try to understand the probability of this phenomena to occur and also the physical causes of these ignitions so that design guidance can be developed. The report reviews available literature that may be of use in the experimental phase of the above project. It includes a summary of the literature previously identified on this phenomena and identifies new literature/information that could have a bearing on this project.

7. Executive Summary

   Objectives

   The aim of this review is to establish which available literature may be of use as part of the HSE funded project, which will investigate spontaneous ignition of accidental hydrogen releases (JR02071). It will identify phenomena that have the potential to cause spontaneous ignition of releases of pressurred hydrogen and identify literature that may be of use when formulating the experimental program.
Main Findings

- The identification of important work that shows conclusive evidence of spontaneous ignition of hydrogen due to the failure of a boundary layer.

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9. Valuation relative to Macroenvironment

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10. Evaluators: EA Technology Ltd

11. Date of evaluation: November 2009

12. Additional useful information:

¹ Rank the Document from 1 to 6 for each of the characteristics of the Macroenvironment. (6 is high content in Document and 1 is very low.)