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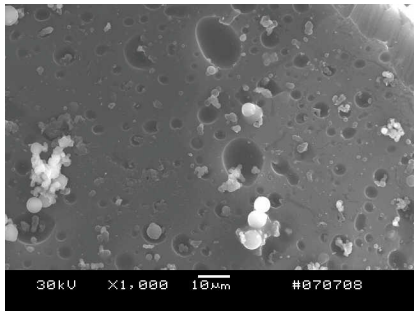
| **Project Title:** | 'Nano-Structured Hybrid Hydrogen Storage Materials for Small Scale Energy Supply Technologies' |
| **Principle Investigator:** | Prof D.K. Ross (University of Salford) |
| **Project duration:** | 01/06/07 – 30/06/10 |
| **Grant Value:** | £341,256 |

One of the solutions put forward for the demand for a clean, efficient form of energy production is the use of hydrogen, in particular hydrogen fuel cells, and the development of the 'hydrogen economy'. The 'hydrogen economy' is a term for a hypothetical future economy where hydrogen is the dominant form of stored energy, the manner in which the UK and other countries might adopt such an economy is currently the subject of much discussion. Hydrogen is seen as such a viable low-carbon energy solution because it can be stored with a high energy density and it can also be used with high efficiency in a fuel cell producing only water.

Hydrogen is highly volatile and is therefore very dangerous to both store and transport and this is a major barrier to the use of this technology and the development of a 'hydrogen economy'. This project is aimed at addressing this problem and the development of a solution originating in the UK could also have enormous potential benefit to UK industries. The general objective of this project is to develop a material that will reversibly absorb hydrogen at a high density, probably at liquid nitrogen temperatures. This will be an efficient way of storing energy locally. The hydrogen can be delivered by pipeline or liquid hydrogen tanker or can be generated by electrolysis. It can then be converted back to energy in a fuel cell, either as part of a CHP scheme or as a back-up power supply for eg a hospital.

It is intended the material will absorb hydrogen through a mix of Physisorption / Chemisorption. These are interactions between the surface where the adsorption takes place and the adsorbed substance in the presence of a catalyst, the differences between these are that Chemisorption is where the substance, hydrogen, is absorbed by means of chemical bonding and Physisorption by means of physical bonding. Once this solution has been developed and a prototype created work will then be done to test it and exploit it commercially.




This project has involved working with a number of industrial partners who are based in the North West and are interested in developing products for hydrogen storage such as fuel cells etc. A collaboration was also formed with a company that manufacture road tankers and are developing a liquid hydrogen tanker. Prof. Ross's solution involves filling the tanker with the porous matrix that is being developed for this project, this should allow the tanker to be filled with hydrogen at a similar density to current tankers but at considerable cost savings. This main advantage of this solution is the considerable safety advantages it offers over currently available tankers due to the slower release of hydrogen in accident situations.