Systems for large scale hydrogen storage and delivery

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Significant research has occurred recently that has contributed to an understanding of how to reversibly store hydrogen safely and efficiently. In 2002 I became aware, through following international literature, that the Mg-Ni system was a suitable candidate for hydrogen storage applications. I applied my experience in solidification control and characterisation of eutectic microstructures to investigate bulk casting as means of producing a suitable alloy from this system. The research was novel in the field of hydrogen storage alloys as it resulted in a commercially viable product that could be economically cast, in bulk, to produce a nano-scale microstructure with acceptable kinetics of hydrogen absorption and desorption. The alloy that was developed also displayed a spontaneous protective oxidation reaction preventing the release of hydrogen from the alloy in a compromised storage system. This research resulted in the development of a spin-off company, Hydrexia Pty. Ltd. in 2005. Hydrexia attracted over $20m from investors including Air Liquide, and employed many full time staff in Queensland.