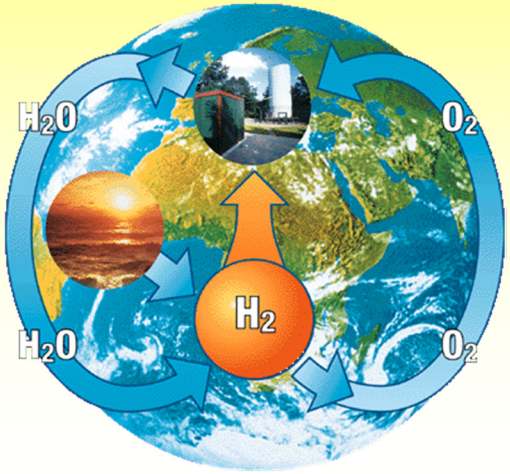
Hydrogen Energy Research



HYDROGEN TODAY

For more than one hundred years hydrogen has been a commercial product. While famous as a potential low carbon vehicle fuel, today such applications account for only roughly 4% of global hydrogen production. The vast majority is produced for chemical engineering applications in petroleum refining or ammonia production for agricultural fertilizer.

Hydrogen technology is currently competing with electric battery technologies to power the low carbon transport of the twenty-first century.

Hydrogen can be stored on a vehicle as a high pressure gas, as a cryogenically cold liquid or adsorbed on a special porous substrate. In each case there is no requirement for special scarce metals as required for battery technology. Also hydrogen is well suited for sale using infrastructures developed for the global petroleum industry.

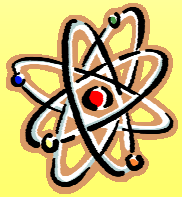
HYDROGEN AND THE OU

Hydrogen energy research is one of several important energy-related topics at The Open University.

Many faculty, staff, and students at the OU are working with collaborators in industry on hydrogen storage, production, and utilization. They are inventing new hydrogen technologies involving two-dimensional materials, and using various high-end characterisation techniques. The work is contributing to the growth of hydrogen infrastructure in both in Milton Keynes, UK and the United States.

NUCLEAR ENERGY & HYDROGEN

Via the Imperial-Cambridge-Open Centre for Doctoral Training in Nuclear Energy we are researching the potential for nuclear process heat (fission and fusion) to be used for the direct thermochemical production of hydrogen at high temperatures, for example via the 800°C Sulfur-Iodine cycle. Such processes are more efficient than electrolysis.



SUNLIGHT & HYDROGEN PRODUCTION

Hydrogen can also be produced from sunlight using photocatalysis. Also avoiding inefficient electrolysis this low-carbon process involves a direct chemical conversion of water into hydrogen and oxygen. One key underpinning requirement is to make complex smart materials possessing unusual properties and enabling specific functions. The OU has leading capability in this area.

An important goal of OU research is to develop new kinds of nanomaterials able to lead to more-efficient and less-expensive solar energy to hydrogen conversion.

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