

PHOTO-CATALYTIC CONVERSION OF SUNLIGHT TO HYDROGEN USING THE TANDEM CELL

LEAD ORGANISATION

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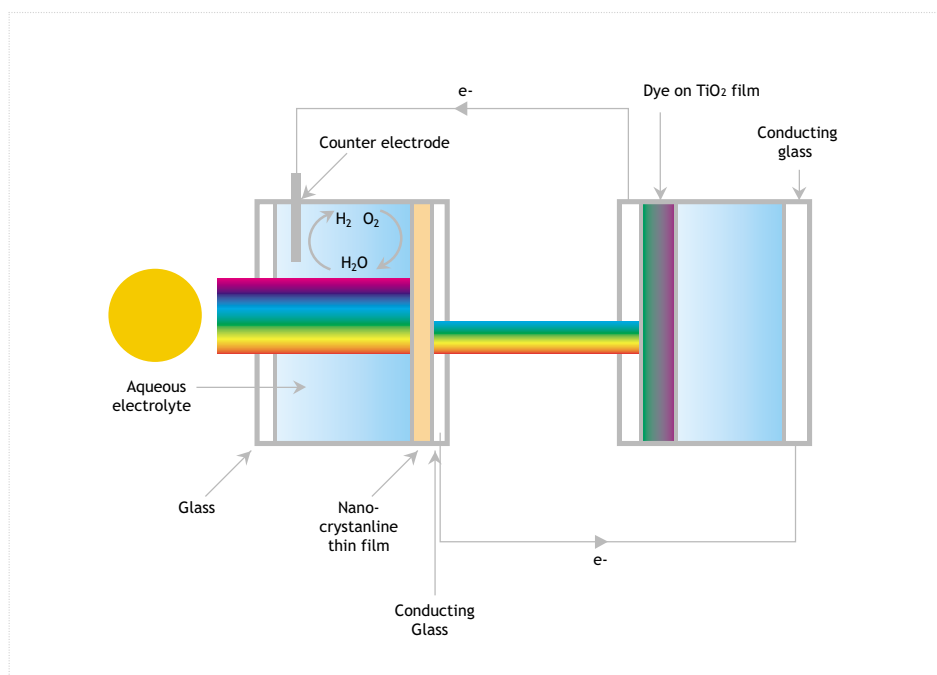
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COST AND DURATION

The Carbon Trust contribution towards this project is £231,300. The project started in September 2003 and is due for completion in December 2004.

PROJECT REFERENCE NUMBER

2002-12-35



Tandem Cell

OBJECTIVES

The main objective of this project is to develop a scaled-up version of the Tandem Cell to validate the technology and to verify the competitive advantages.

SUMMARY

The Tandem Cell converts water directly into hydrogen fuel using light in a renewable and carbon-free process. It has the potential to reduce carbon emissions significantly by substituting for fossil fuels and other routes to hydrogen which produce significant carbon emissions.

The Tandem Cells can be located close to the hydrogen point of use, thus also eliminating the transportation costs associated with the displaced fossil fuel. The hydrogen produced can supply fuel cells for electricity generation, or can be burned directly in combustion systems without carbon dioxide emissions.

The key to this technology is the performance of the photo-catalytic nanocrystalline thin films, used to gather the photons of incident light and convert them to electrons for directly splitting water. Industrial research, conducted as part of this project, includes selecting the best thin film materials and deposition techniques and building a facility to demonstrate repeatable film results at scale-up.

The second part of the project consists of detailed design of Tandem Cells and arrays, cell assembly and testing, and studies of production methods. Comparative cost studies with other technologies will also be carried out.

It is projected that, assuming an uptake of only 5% over several years, potential savings of over 2.1 million tonnes of CO₂ may be achieved each year.