



Project Acronym : SOLHYCARB

Project Title : Hydrogen from Solar Thermal Energy: High Temperature Solar Chemical Reactor for Co-production of hydrogen and carbon black from natural gas cracking

Coordinator : CNRS - Centre National de la Recherche Scientifique (France) / PROMES - Laboratoire Procédés, Matériaux et Energie Solaire (France)

Website : <http://www.eshs.be/index.php?id=97/>

ABSTRACT

The SOLHYCARB project addresses the development of an unconventional route for potentially cost-effective hydrogen production and carbon nano-material synthesis by concentrated solar energy. The novel process thermally decomposes natural gas (NG) in a high temperature solar chemical reactor. Two products are obtained: a H₂-rich gas and a high-value nano-material, Carbon Black (CB). Therefore H₂ and marketable CB are produced by renewable energy. The project aims at designing, constructing, and testing innovative solar reactors at different scales (5 to 10 kWth and 50 kWth) for operating conditions at 1500-2300 K and 1 bar. This experimental work is highly combined with advanced reactor modelling, study of separation unit operations, industrial uses of the produced gas, and determination of CB properties for applications to batteries and polymers. The design of decentralized and centralized commercial solar chemical plants (and hybrid plants) -50/100 kWth and 10/30 MWth respectively- closes the project. The two 10-20 kW solar reactor prototypes have been designed and manufactured at WIS and at CNRS. The WIS reactor is based on the direct heating concept (direct irradiation of the reactants by concentrated solar energy) whereas the CNRS reactor uses the indirect heating concept (use of a transfer walls -tubes- between the reactants and the solar radiation). Experiments at the 50 kWth scale are planned during Spring-Summer 2009.

PARTNERS

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