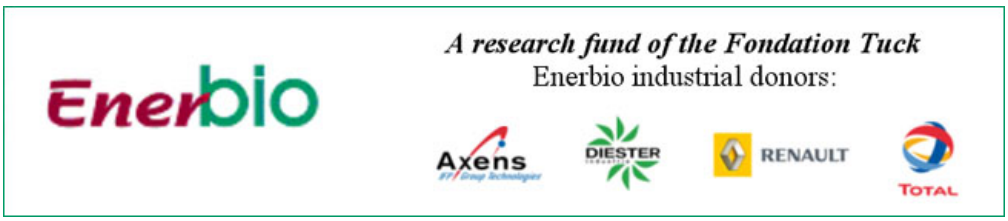
Evaluation and development of the Chemical-loop approach as an alternative technology for the production of hydrogen from bioethanol with inherent separation of carbon oxides



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Title of the project	**Evaluation and development of the chemical-loop approach as an alternative technology for the production of hydrogen from bioethanol with inherent separation of carbon oxides**
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Responsibles for thesis	- Dr. Fabrizio Cavani - Dr. Jean-Marc Millet
Duration	Three years end 2010 to end 2013

Summary

The research work will investigate the « chemical-loop" approach for the reforming of bioethanol into CO/CO2 and H2 produced separately. The aim is to make the production of H2 simpler and economically more convenient than it is currently done by conventional methane reforming. An additional advantage in terms of sustainability is the use of bioethanol as the source of hydrogen, instead of natural gas.
The chemical-loop approach has never been applied to bioalcohols, although it would be well adapted and economically favorable. The approach consists in separating the two distinct steps of a reforming process. The first step is the reduction of a mixed oxide material with bioethanol, with production of CO, CO2 and H2O. The second step is the reoxidation of the reduced oxide with water and the generation of a concentrated stream of H2. The aim of this research will be to define conditions and materials that may lead to an optimized process, allowing producing hydrogen stream that does not require any additional purification or separation treatment.
The PhD student will investigate the chemistry of the process by means of both in-situ and ex-situ techniques, the characteristics of the mixed oxides, in terms of the redox properties, morphology and chemical/physical features, with the aim of defining the characteristics that such material should possess in order to make the chemical-loop process highly efficient.

Contact

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