Instrument: Large Scale Collaborative Project
Thematic Priority: FP7-ENERGY.2009.3.3.1
Grant Agreement: 241718

TECHNOLOGY OFFER:
ACRYLIC ACID FROM ALLYL ALCOHOL

OVERVIEW

Description: Process ☑, Pilot ☐, Product ☐, R&D knowledge ☐, Other ☐

Benefit summary: Process for the production of acrylic acid from renewable resources.

Allyl alcohol — acrylic acid

Development summary: Demonstration at the laboratory scale. Productivity reached 1.1 $g_{Acrylic\ acid}/g_{cat}\cdot h^{-1}$

IP Summary: Patent filing in progress.

Novelty

- **Technology Benefit description:** Acrylic acid is currently produced by selective oxidation of propene via acrolein as an intermediate. The corresponding process is non-sustainable since it uses propene from petrol resources, of which the supply is furthermore not securized. The present process introduces Allyl Alcohol as an alternative source for acrylic acid. We have demonstrated that allyl alcohol can be selectively oxidized to acrylic acid with a yield up to 98%.
- **Technology differentiation versus competition (and Uniqueness):** Compared to propylene selective oxidation, the process via allyl alcohol can be characterized as sustainable, since allyl alcohol can be obtained from glycerol or 1,3-propane-diol, which are well-introduced platform molecules in biorefinery concepts. Another competitive process to acrylic acid is based on the dehydration of glycerol to acrolein, which can then be oxidized to acrylic acid. Even though this process is well described in open and patent literature, one of the main drawbacks is the deactivation of the catalysts employed in the dehydration reaction of glycerol

Development

- **Technology Readiness Level (Scale):** TRL 1 ☐; 2 ☐; 3 ☐; 4 ☑; 5 ☐; 6 ☐; 7 ☐; 8 ☐; 9 ☐
- **Development Status summary:** The corresponding process has been successfully demonstrated at the laboratory scale for 5 h time on stream. During this time, 16 g of acrylic acid have been produced over 3 g of heterogeneous catalyst, thus corresponding to a space time yield of 1.1 g of product per g catalyst per hour.

Intellectual Property

Patent Application / Granted				
Priority Patent Number	Title	Countries	Status	Priority date
DI 06326-01 (CNRS)	Procédé de production d'acide acrylique à partir d'allyl alcool	FR	DI	

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Provider

- **Technology provided by:** UCCS (CNRS UMR8181)
- **Related Expertise:** development of the process and the related heterogeneous catalyst

Partner	Academic/Industry	Research / Pilot / Demonstration / Other
CNRS-UCCS	Academic	Research and demonstration

Licensing

- **Collaboration type sought:** Collaboration for technology development.
- **Support provided:** UCCS can provide access to the laboratory scale reaction setup for collaboration on the development of the technology. For the latter, UCCS will also assist with manpower in order to optimize catalyst formulations and reaction conditions.
  If required, UCCS may also provide samples from the reaction product mixture (non-purified raw mixture).

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