TECHNOLOGY NEED:
MEMBRANES FOR THE COKE FREE REMOVAL OF H_2 FROM A C_3H_X MIXTURE

OVERVIEW

Description: Development of a membrane system able to remove hydrogen from a propane - propylene mixture that does not suffer from deactivation from coke formation

Benefit summary: The as developed membranes would be applied in membrane based propane dehydrogenation process for propylene production

Development status: Current palladium membranes suffer from coke deactivation by propylene above 300°C. Alternatives, like silica-based membranes, lack sufficient stability. A novel solution is required that allow for the stable coke free operation at >450 °C.

IP status: No patent application filed

NOVELTY

- **Technology need description**: A novel process scheme that introduces the concept of membrane separation in the process of production of propylene by propane selective dehydrogenation has been developed. The novel process is based on a "hybrid architecture" concept where a combination of catalytic reactors, membrane separators and membrane integrated catalytic reactors is performed (Figure 1).

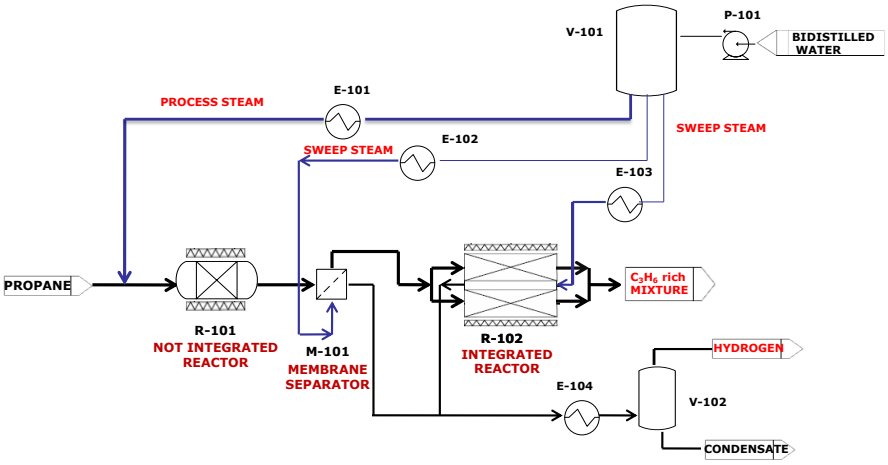

Figure 1. Membrane based propane dehydrogenation – hybrid configuration process scheme

The main limit of such novel technology is that the state of the art membranes have limited stability under the operation conditions. The development of a coking resistant membrane, able to work at temperature of 450°C, would enable the assessment and demonstration of the technology and its potential application at industrial level.

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DEVELOPMENT

- **Technology Readiness Level**: TRL 1 ☑; 2 ☐; 3 ☐; 4 ☐; 5 ☐; 6 ☐; 7 ☐; 8 ☐; 9 ☐
- **Development status**: For the time, various membranes have been shown to have to the required initial properties, like selectivity and permeability, but lack the stability due to coke formation and low (hydro)thermal stability.

INTELLECTUAL PROPERTY PROTECTION

- **Technology protection (preferably)**: Granted patents ☑; Patent application with International Search Report ☑; Patent application ☑; Other, … ☐
- **Protection sought in following countries:** All Countries afferent to PCT Application

PROVIDER SPECIFICS

- **Preferable provider**: Company operating the technology ☑; Equipment provider ☑; Research Institute ☑; SME or spin-off company ☑; Other, … ☐

LICENSING

- **Collaboration type sought**: We seek for a collaboration with Public or Private Institutions with relevant skill in Pd based membrane development
- **Support to be provided**: Expertise in membrane manufacturing

CONTACT DETAILS

Name:	Ing. Gaetano Iaquaniello/Ing. Emma Palo
Organization:	KT – Kinetics Technology S.p.A.
Address:	Viale Castello della Magliana 75, 00148 Rome, Italy
E-mail:	g.iaquaniello@kt-met.it/e.palo@kt-met.it
Phone:	+39 0660216231/+39 0660216668

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