

TECHNOLOGY OFFER: CONCEPTUAL DESIGN METHODOLOGY FOR CATALYTIC MEMBRANE REACTORS

OVERVIEW

Category: Membrane , Catalyst , Reactor , Process , R&D knowledge , Other

Benefit summary: A novel knowledge-based methodology enables the selection and conceptual design of catalytic membrane reactors (CMR) in an early stage of development. The system encompasses 19 packed-bed, catalytic-membrane, and fluidized-/slurry-bed membrane module types and ranks them on suitability on the basis of key design criteria.

Development status: First prototype ready

IP status: No patents

NOVELTY

- Technology benefit description:** The tool/methodology helps the researcher or conceptual design engineer with the evaluation of catalytic membrane reactor concepts and their technical design on the basis of 12 leading criteria. Only basic input is requested through a user dialog and the systems supports the user by proposing or calculating key design variables. The methodology leads to a ranking of 19 different CMR module types (Figure 1), which is graphically displayed including the uncertainty ranges.
- Technology uniqueness and comparison vs state-of-the-art:** This knowledge-based system for selection and conceptual design of catalytic membrane reactors (CMRs) is a novel tool, now available for the membrane community and process industry who consider the design or application of CMRs.

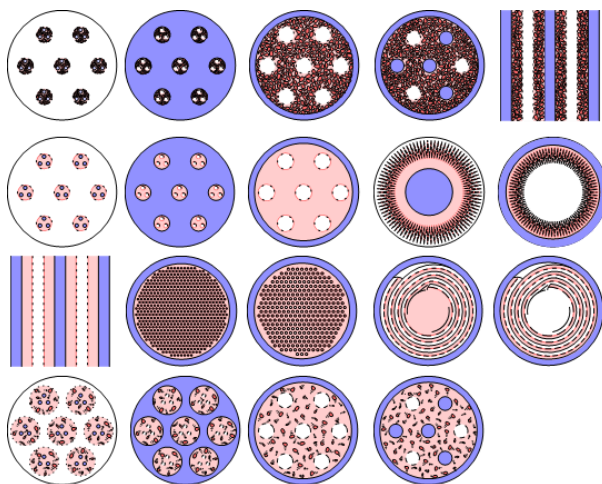


Figure 1: Catalytic Membrane Reactor (CMR) modules considered include:

- packed-bed membrane reactors
- catalytic-membrane reactors
- fluidized- or slurry-bed membrane reactors

DEVELOPMENT

- Technology Readiness Level:** TRL 1 ; 2 ; 3 ; 4 ; 5 ; 6 ; 7 ; 8 ; 9
- Development status:** First prototype is available.

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INTELLECTUAL PROPERTY

Patent / application N°	Title	Countries	Status	Priority date
No patent application				

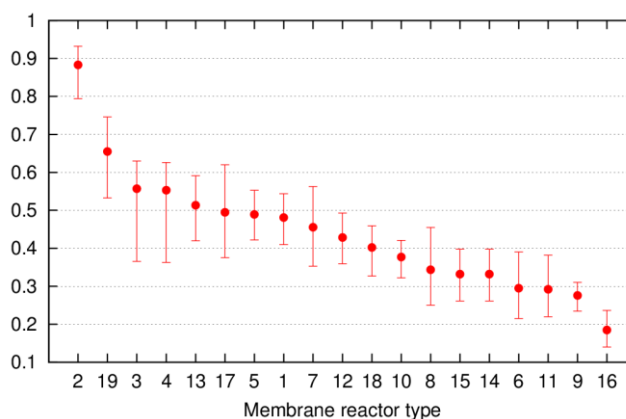
TECHNOLOGY PROVIDER

- ▶ **Technology provided by:** Process Design Center B.V.
- ▶ **Related expertise:** Process Design Center (PDC) develops and exploits process design expert systems under the name of PROSYN®. With these tools PDC can provide a unique set of services in process development & process evaluation.

TECHNICAL DETAILS

- ▶ **Description:** The conceptual design methodology is developed and maintained using logic programming. This allows straightforward incorporation of rules, while the system searches its way through the rule base. Through a user dialog interface only the most essential input has to be provided by the user, while the system calculates or suggests other parameters until it can reach (intermediate) conclusions. The final outcome is a ranking of CMR modules (Fig. 2) with explanation why certain module types are less suitable or unsuitable for the particular case.

Figure 2: Typical outcome of a ranking of CMR concepts with uncertainty ranges



LICENSING

- ▶ **Collaboration type sought:** Application of CMR conceptual design tools for industrial process design and development of CMRs. Also, we seek collaboration to extend the development of membrane (reactor) expert systems.
- ▶ **Support provided:** Expertise in designing, programming and maintaining conceptual design methodologies and tools.

CONTACT DETAILS

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