

Reactor Optimization by Membrane Enhanced Operation: Process intensification with membrane reactors (ROMEO)

<u>A. Weißa</u>, P. Wolfa, M. Haumanna and P. Wasserscheida

^a Lehrstuhl für Chemische Reaktionstechnik, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Egerlandstraße 3, 91058 Erlangen, Germany

What is ROMEO?



Started in **September 2015** with an EU budget of **6 million** euros



- Gas phase **hydroformylation** reaction as case study
 - Side product difficulty

The Concept of ROMEO

Supported Ionic Liquid Phase (SILP) Catalysts:

- Innovative immobilization concept for gas phase applications
- Heterogenization of homogeneous catalysts
 - Free flowing powder
 - Homogeneous catalyst phase (Ionic liquid + precursor + ligand) impregnated into pores of support material





Heterogeneous Catalysis



Reactor Set-up & preparation procedure:













Summary

- Investigation of novel membrane reactor concept
- Combination of already studied building blocks into a single membrane reactor module
 - Novel support materials
 - Membrane functionality
 - SILP catalyst
- Teamwork of different partners on support fabrication, membrane coating & SILP impregnation
- Successful screening of suitable support materials
- Establishment of membrane reactor set-up
- Successful application of monolith supported SILP catalysts
- First investigation of SILM module:
 - Successful preparation process at different partner sites
 - First catalytic active membrane module







Lehrstuhl für Chemische Reaktionstechnik Vorstand Prof. Dr. P. Wasserscheid Egerlandstr. 3 91058 Erlangen Germany www.crt.cbi.uni-erlangen.de