

DATAFAB

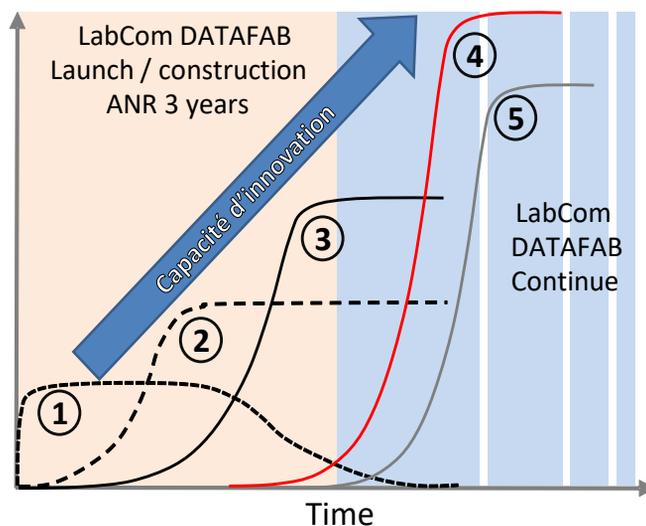
A joint laboratory between
Processium and LGPC



The design, sizing, economic evaluation and time required for the implementation of chemical processes are extremely dependent on the number, diversity and robustness of available process data at the time of decision making. The aim of the DATAFAB Joint Laboratory is to increase the competitiveness of companies in the chemical sector and related sectors (pharmaceutical, agronomic, cosmetic, energy...) by implementing technologies and methodologies that allow rapid and reliable acquisition of such data.

DATAFAB will provide solutions to achieve this goal by increasing the transfer of know-how between the academic partner, the catalytic process engineering laboratory (LGPC UMR5285 CNRS - CPE Lyon - University Claude Bernard Lyon 1) and the industrial partner, Processium, a Lyon-based SME with expertise in separation processes and thermodynamics.

This venture is supported by the LabCom program of the French National Agency for Research during the first 3 years of the project (funding ANR-17-LCV2-0013).



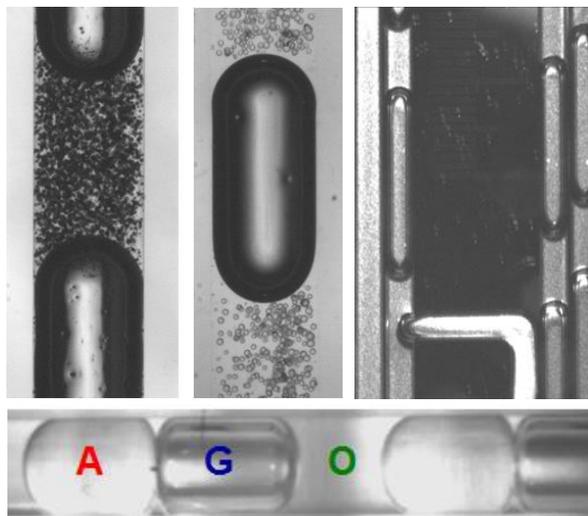
WORK PROGRAM

The DATAFAB work program is broken down into 3 main phases:

- At short terms: implementation of traditional data acquisition technologies such as stirred tank pressure reactors, calorimeter, etc.
- At mid-term: implementation of new innovative technologies demonstrated and used in the laboratory such as gas-liquid and liquid-liquid segmented flow or other microreactor technologies mastered at LGPC.
- On the longer term by developing new technologies that are currently at the proof-of-concept level.

EXPERTISE

- Catalysis by metals (heterogeneous and homogeneous).
- Meso- and micro-structured reactors.
- Kinetic measurements and modelling.
- Chemical reactor engineering.
- Process synthesis
- Thermodynamic measurements and modelling
- Process simulation.
- Design of distillation, extraction, crystallisation,....
- Lab scale process trials



Examples of segmented flow (a) H_2 -water- 50 g/L Ni/SiO₂ (b) G/L/beads (c) O_2 -cyclohexane at 30 bar, 200°C (d) Aqueous-gas(H_2)-Organic (hexane) G/L/L flow.

EQUIPEMENT & FACILITIES

- 2 G/L Oxygen and Hydrogen Flow Reactors up to 50 bar, 200°C
- Kobelco FlowReactor (50 bar, 200°C)
- G/L FlowReactor for Chlorination (Cl₂) 5 bar, -20° to 80°C.
- L/L FlowReactor
- G/L/S FlowReactor for hydrogenation (40 bar, 150°C).
- Three-phase batch reactors and fixed-bed reactor up to 50 bars.
- Robinson-Mahoney type reactor.
- Single mode micro-wave reactor
- Microreactors and micromixers, including silicon chip reactors
- Analysis : gas, liquid and ionic chromatography, porosimeter, BET, mass spectrometer, zetasizer, rheoviscosimeter...
- Workstation
- On-line data acquisition FTIR-Metler, UV



CSTR Robinson-Mahoney basket reactor.

PUBLICATIONS

- Angew. Chem. Int. Ed. 2000, 39, 3442-3445
- Adv. Synth. Cat. 2003, 345, 190-193
- Chimia 2002, 56, 621-626.
- Lab on Chip 2008, 8, 814 – 817
- Adv. Synth. Catal. 2015, 357, 739-746
- Chem. Eng. J. 2016, 287, 92-102
- Ind. Eng. Chem. Res. 2015, 54, 4699-4708
- J. Flow Chem. 2018,

ONE PROJECT, THREE SITES

DATAFAB will develop at three places:

- LGPC, located at CPE Lyon, the School of Chemistry and Chemical Engineering of the University of Lyon, with ca. 1000 m² of facilities, including different type of catalytic reactors, with a focus on heat and mass transfer and reactor modelling.
- PROCESSIUM, located in a new building with more than 5000 m² and pilot facilities, close to the University campus LyonTech La Doua, 10 min walking from CPE.
- AXELONE, the new collaborative platform set as a joint venture between the academic and industry sectors of the Lyon's metropolitan area, 3 min from CPE.



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