



Aim

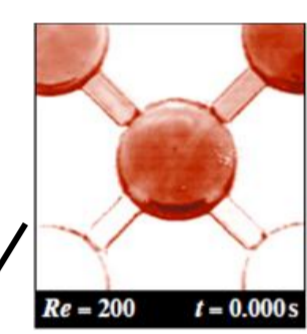
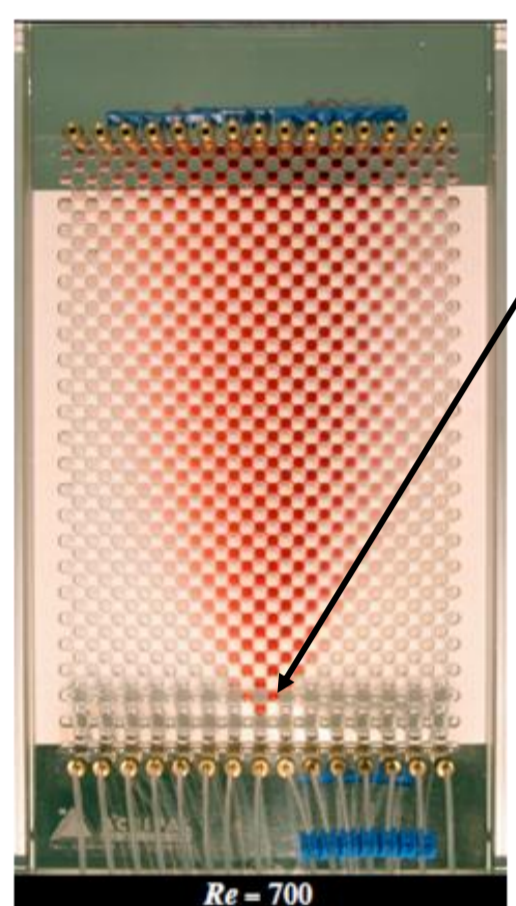
The aim of this work package is **to develop, realise and test tailored micro- or/and mesostructured devices for two-phase liquid-liquid reactions** up to pilot scale with throughputs ranging from several litres up to hundreds of litres per hour. This will be done based mainly on the experience of Fluidinova (FLU, ) and Institut für Mikrotechnik Mainz GmbH (IMM, ) with input from the other project partners.

Content

- Analysis of the example chemical processes and corresponding evaluation of existing reactor designs
- Realisation and provision of structured lab-scale reactors for process investigations
- Reactor development and 1st generation pilot reactors
- Refined scale-up considerations and 2nd generation pilot reactors
- Broadening of reactor concepts for other application examples

Current status of the progress is the realisation of the 1st generation pilot reactors.

Selection, realisation and provision of equipment for lab-scale investigations



NETmix[®] concept (left) and lab set-up for bulk chemical process with integrated NETmix[®] reactor (right).

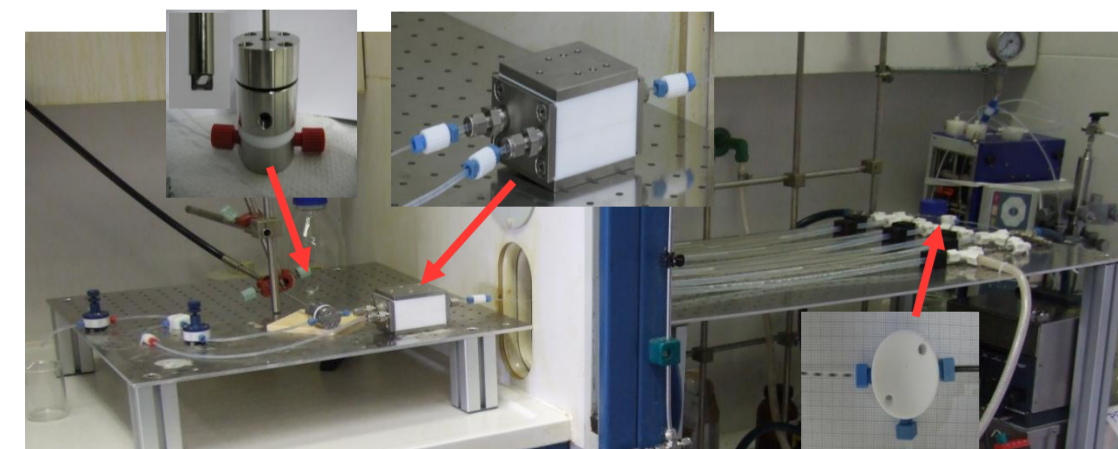


Due to the involvement of FLU and IMM both mesostructured (NETmix[®] concept) and microstructured reactor concepts will be explored.

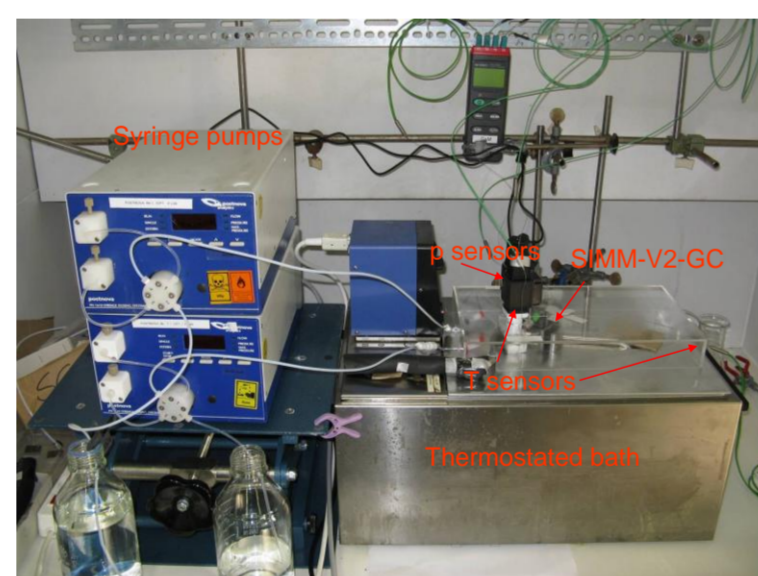
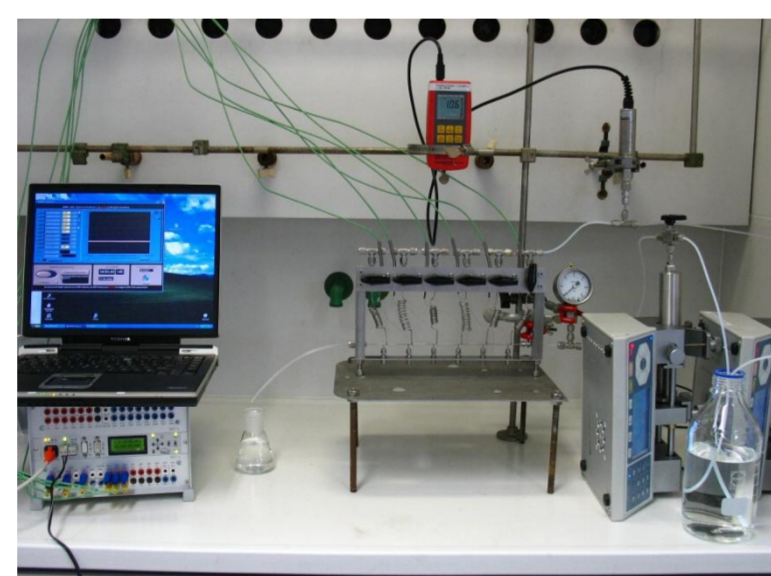


IMM evaluated and developed further different micromixer and reactor concepts

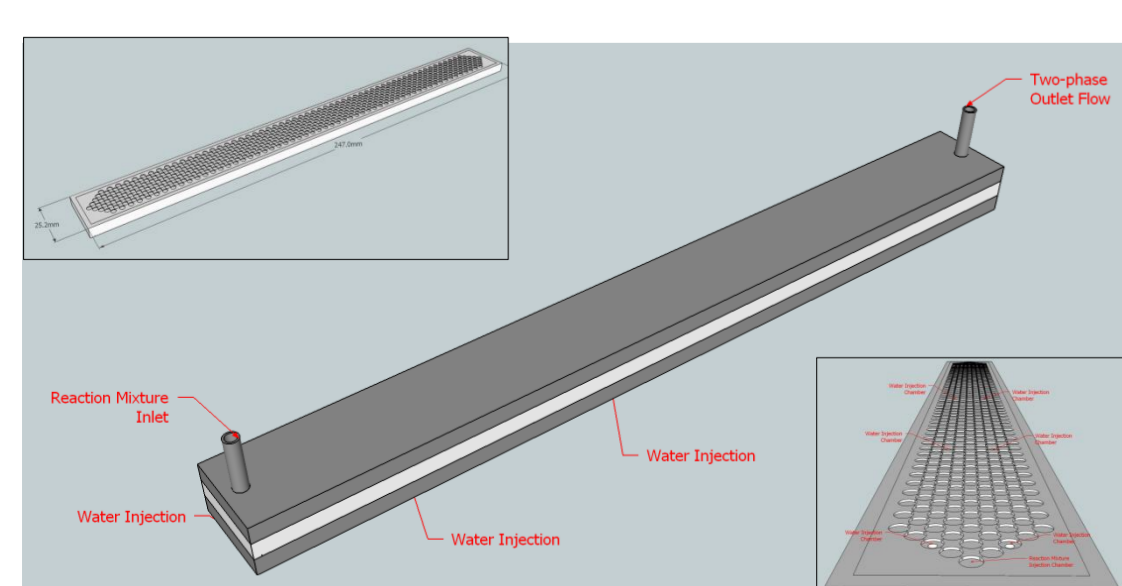
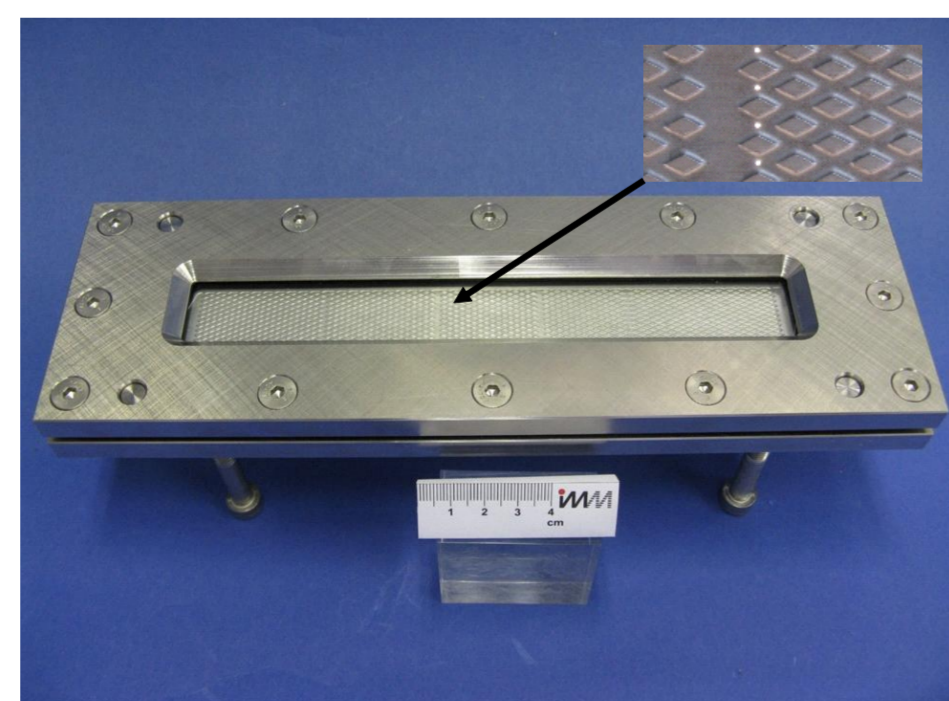
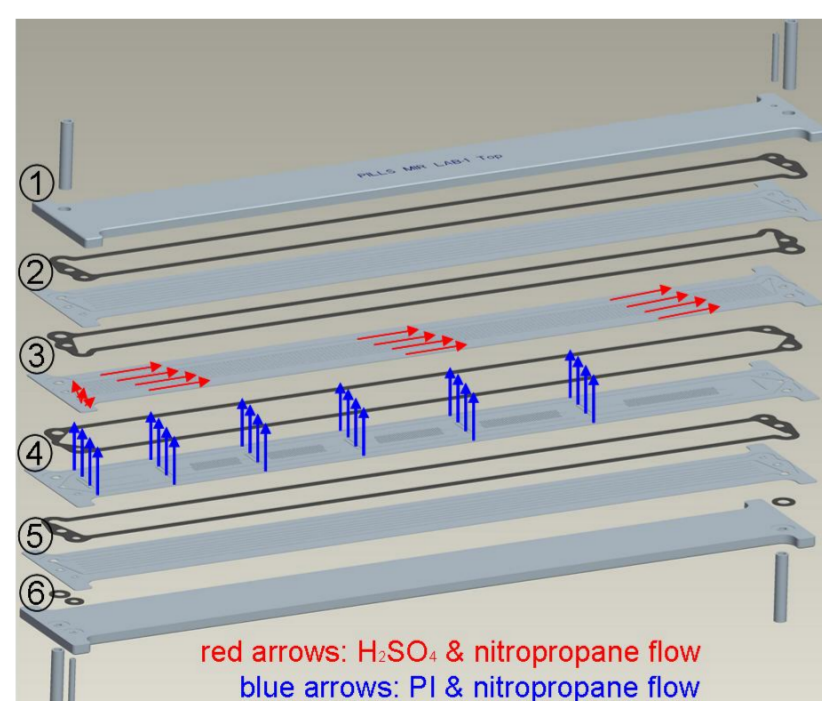
Slug-flow lab set-up with flow splitter and ATR-IR-sensor



Lab set-ups for: fine chemical and bulk chemical process

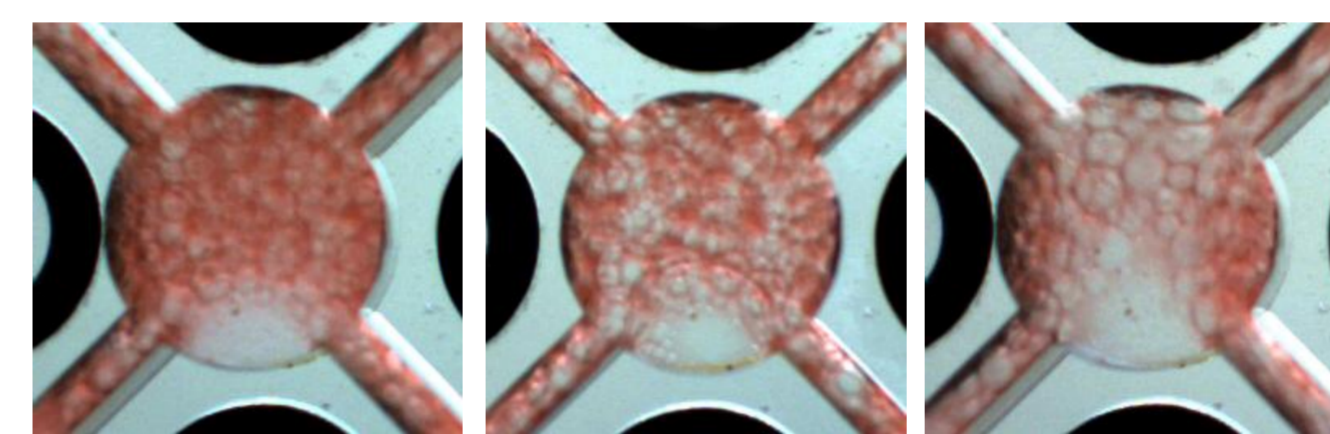


1st generation pilot reactors for the fine chemical process

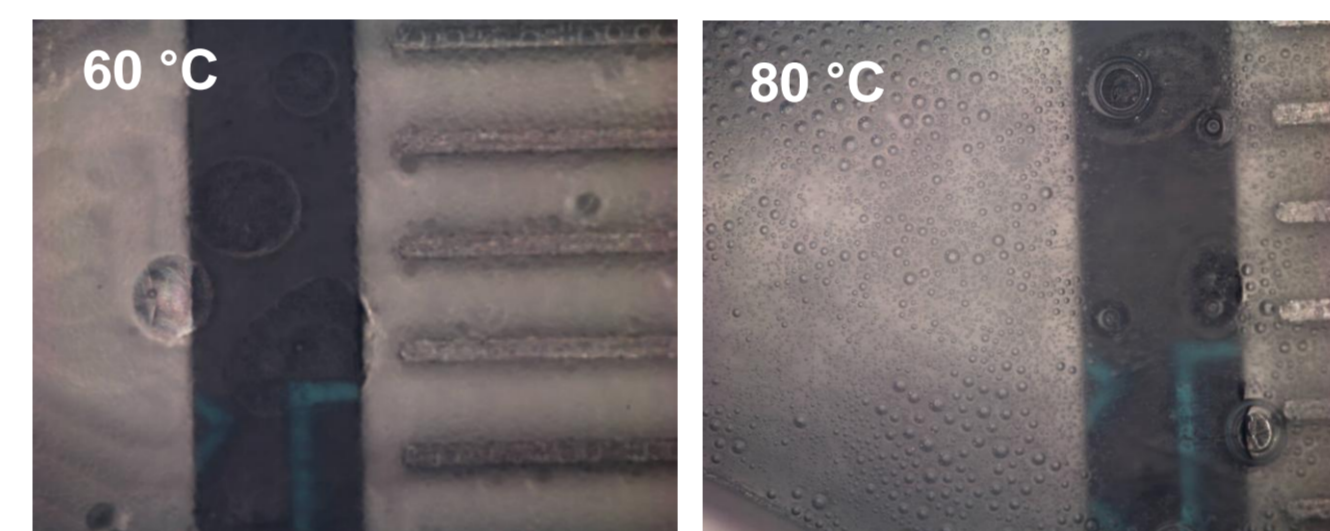


For the homogeneous cyclisation step a microreactor with multiple injection points (top) will be used. For the quenching step a NETmix[®] reactor (left) - again with multiple injection points - is in the design phase.

Studying dispersion performance of equipment

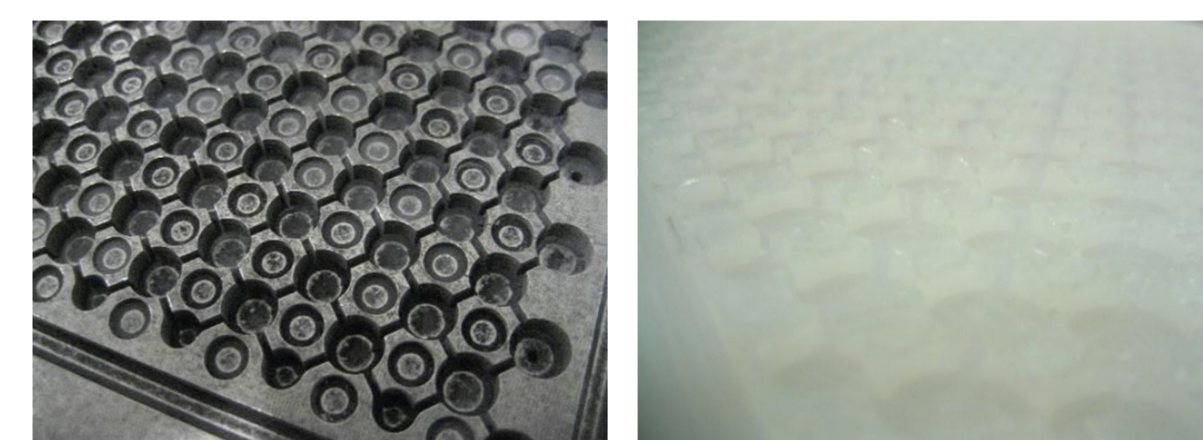


NETmix[®] dispersion experiments with red-colored organic phase



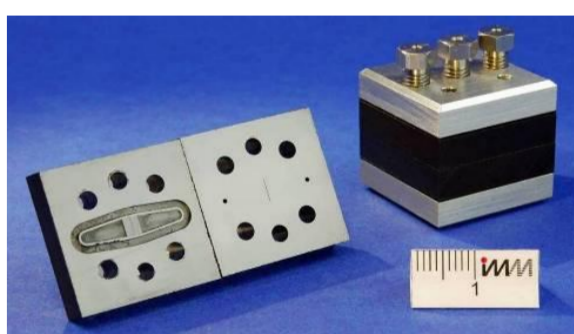
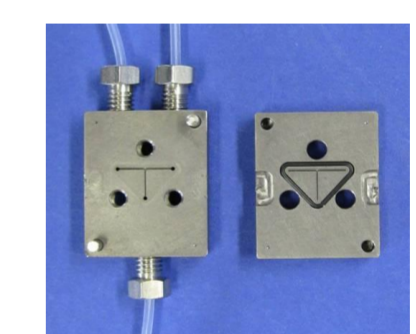
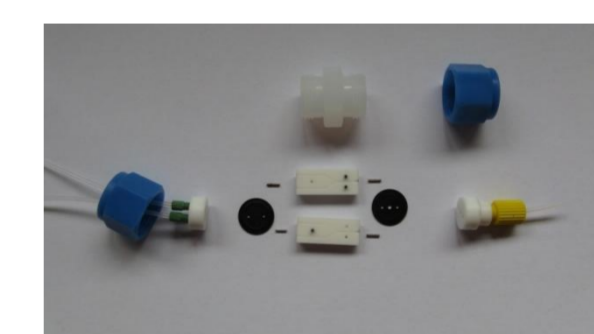
Investigation of dispersion by micromixers (here via flow cell with inspection window after the mixer)

Tackling corrosion challenges



NETmix[®] reactor: Left: Ta coating. Right: PFA-version

Exploration of new materials for microreactors:



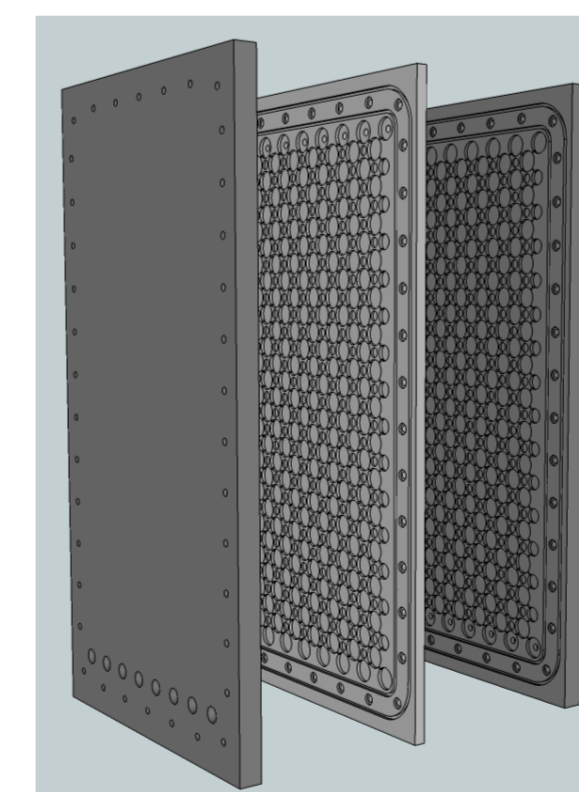
Macor[®]

Ta

Glassy carbon

1st generation pilot reactors for the bulk chemical process

Schematic of NETmix[®] reactor and NETmix[®] reactor installation for the Experimental Research Facility (ERF)



Microreactor installation for the ERF (without mixer part): schematic view and early realisation stage picture

