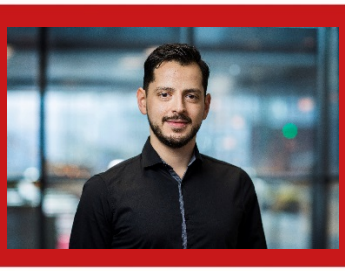
**Sustainable Process Engineering**
**Chemical Reactor Engineering**

EINDHOVEN UNIVERSITY OF TECHNOLOGY

# Heterogeneous phase mixing in a rotor-stator Spinning Disc Reactor



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## Introduction

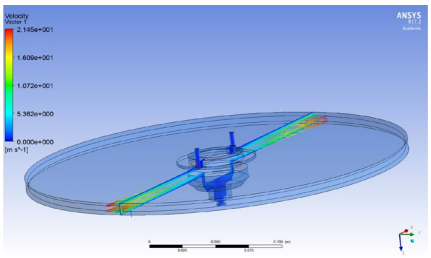
The importance of mixing when fast, complex chemical reactions take place is a topic of extreme concern when high purity of products is required. In order to avoid undesired by-products, the mixing of the reagents must be as fast as the reaction time, which is determined by the kinetics. In simple words, for fast reactions when the reagents cannot "find" each other to react and form a desired product, then they will react with other available materials and form undesired ones – something we need to prevent.

## Project summary

The rotor-stator Spinning Disc Reactor (rs-SDR) consists of a rotating disc (the rotor) within a fixed cylindrical housing (the stator). Previous work has shown high rates of mass transfer and heat transfer. It also exhibits a high degree of turbulence, and since the turbulence promotes mixing in flowing fluids, this reactor could be expected to enhance the performance of fast reactions.

From previous research, low mixing times have been obtained, in the range of milliseconds.

Ongoing research explores experimental work and modeling of viscous systems where reaction occurs in the viscous-convective subrange of turbulence, and the enhancement of selectivity for competitive reactions that are typically mass transfer limited, and depend on the droplet breakage.



## Project goals

The goal is to obtain fundamental knowledge on the micromixing mechanisms and the hydro-dynamics in a spinning disc reactor, and develop models validated by experiments, to predict and improve the selectivity of reactions for **multiphase systems** (highly viscous liquids, immiscible liquids, and solid-liquid systems). Some topics to investigate are a.o.: effect of viscosity, immiscible mixing with mass transfer.

## Contact information

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