

# Process Intensification of Tertiary Amine Oxidation

A. Chaudhuri, J. van der Schaaf



## Introduction

With global warming a major concern in today's world, the industry has been steadily moving towards green, and intensified processes. One example of this is the reduction in the use of solvents such as alcohols in immiscible reactions. While such processes are "green", they then become multiphase in nature, complicating the kinetics of the system. We would like to investigate the rotor-stator spinning disc reactor as a possible method to improve on the current process in industry.

## Project summary

The project seeks to investigate a method through which the oxidation of tertiary amines can be intensified. Currently in the industry, the oxidation is carried out in a semi-batch process; however, due to the biphasic nature of the reaction mixture, the time to complete the process is long and the yields are low. We expect that with the use of a rotor-stator spinning disc reactor we will be able to improve on these initial rates and drastically reduce the time to reach high conversions.

Along with a method for process intensification, we are also studying the fundamental aspects, for instance the reactor hydrodynamics or reaction kinetic, both catalyzed & non-catalyzed. Consequently, the specific project can be tailored to the interests of the student.

This project will be carried out in association with Nouryon.

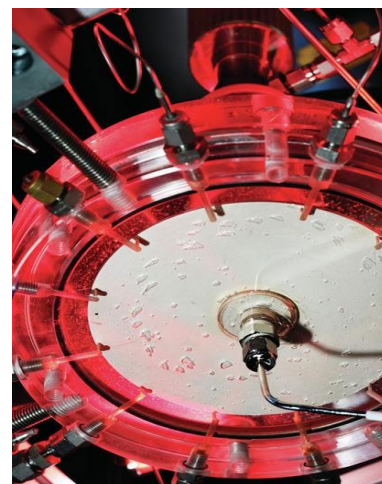


Fig. 1: A rotor-stator spinning disc reactor which will be used to intensify the process.

## Project goals

- Kinetics of the Oxidation of Dimethyldodecylamine (catalytic & non-catalytic)
- Effect of viscosity on the macromixing characteristics of a spinning disc reactor.
- Determination of the degradation kinetics of dimethyldodecylamine oxide
- Process Conditions for optimized amine oxide production in the RS-SDR

## Contact information

Arnab Chaudhuri, [a.chaudhuri@tue.nl](mailto:a.chaudhuri@tue.nl), STW 1.21, tel. 040-2474371