LABORATORY FOR CHEMICAL TECHNOLOGY
Technologiepark 125 9052 Gent, Belgium

Coach	**Supervisor(s)**	**Funding**
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CFD simulation of a novel pin-to-plate plasma reactor for dilute flow VOC abatement

Aim

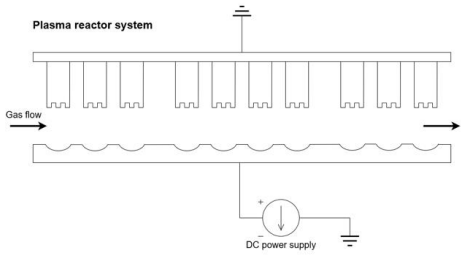
Developing a Computational Fluid Dynamics (CFD) model for simulating a novel pin-to-plate plasma reactor.

Justification

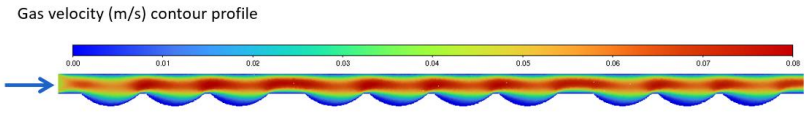
Volatile Organic Compounds (VOCs) are hazardous indoor pollutants. Long-term exposure to VOCs, even at a low concentration, may cause nausea, headaches, and even cancer. Hence, ensuring clean indoor air is important for our well-being.

To address this problem, researchers from various research groups at UGent are collaborating in a multidisciplinary research, COPCAT project, aimed at treating VOCs in indoor air using alternative conversion technologies, such as plasma and (photo)catalysis. One of the project's major innovative elements is the multiscale simulation of an in-plasma or post-plasma reactor combined with a (photo)catalytic reactor. By modelling the reactor hydrodynamics at the reactor scale and including the reaction kinetics at the molecular scale, numerical data can be obtained. These numerical results will be supported by experimental data obtained by other researchers through in-situ monitoring of the experimental setup.

To simulate a novel pin-to-plate plasma reactor, the project will combine a plasma kinetic model with an appropriate CFD model. The work is being carried out in cooperation with the Research Unit Plasma Technology (RUPT) group, Department of Applied Physics, Faculty of Engineering and Architecture, UGent.



Plasma kinetic model → Plasma CFD model (hydrodynamic + reaction)



Program

- ✓ Literature study on the use of CFD and plasma kinetic model to simulate a gas-phase plasma reactor.
- ✓ Performing CFD simulations of the novel plasma reactor incorporating the plasma kinetic model.

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