Innovation of Combustion Particle Control Technologies Assisted By Numerical Modeling

D. Rubinetti[1]

[1]Institute of Biomass and Resource Efficiency, University of Applied Sciences and Arts Northwestern Switzerland, Windisch, Switzerland

Abstract

Worldwide efforts to promote the use of renewable energies include combustion-based technologies that produce substantial amounts of pollutants. In order to control the environmental impact a proper treatment of exhaust gases is required.
This study describes the development of a numerical model for an electric filter to cover the interdependent phenomena of Fluid Mechanics, Particle Dynamics and Electrostatics. Within the COMSOL Multiphysics® software the simulation is set up using the CFD Module, the Electrostatics physics interface, the PDE interfaces and the Particle Tracing for Fluid Flow physics interface in a coupled way.
In the context of an industrially relevant project experimental data is obtained from a test rig and compared to the results from the simulation for validation purposes. Thus, further optimization and development of the electric filter is being carried out based on the presented modelling approach.

Figures used in the abstract

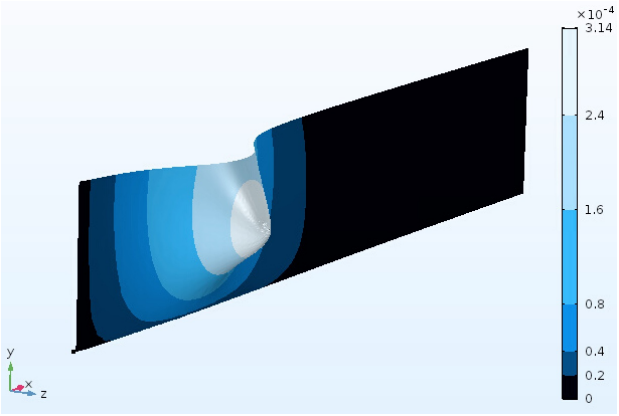

Figure 1: Representative Contour-Plot of the Space Charge Density [C/m^3] emerging from an ionizing electrode for the Electrostatics part of the model.