

WORKGROUP FOR MULTIPHAS FLOWS

Deposition of particles on structured surfaces

Grant number

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Project title

Deposition of submicron particles on structured surfaces in an electrical field

Project leader

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Realized by

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Keywords

Lattice-Boltzmann, Euler-Lagrange, electrical field, deposition of particles

Short description of the project

This project focuses the deposition behavior of submicron electrically charged particles (size range: 20 – 200 nm) on surfaces. Considered is a distribution of electrodes on top of a non-conductive ceramic surface applied with a defined electrical voltage.

Experimental studies show the formation of dendritic structures between the electrodes as a result of the particle deposition.

A numerical model to simulate the growth of these dendritic structures was developed. For this purpose a Lattice-Boltzmann model for the calculation of the gas-flow was coupled with a finite-difference-scheme to calculate the electrical field and an Euler Lagrange model to describe the particle transport. The model considers the effect of deposited particles on the fluid-flow and the electrical field. The agreement between numerical (Fig. 2) and experimental results is qualitatively well regarding to the direction and dynamics of the growth of the dendrites.