

EXPERIMENTAL AND MODEL INVESTIGATION OF FLUIDIZATION OF PHARMACEUTICAL POWDERS DURING COLD PLASMA ASSISTED COATING

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BACKGROUND

C&B

LANGUAGE

English

MORE INFO

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Introduction

With this thesis we aim to further develop fluidization models for select pharmaceutical powders. Coating of a powder requires very good mixing so that all particles are uniformly coated. To ensure this mixing, powders are fluidized while the coating is injected together with cold plasma, which acts as the reaction initiator. During fluidization, particles are subjected to different forces which need to be modeled; gravity, drag force, contact forces, friction, cohesion. The main study objective for thesis is the drag force, but all of them must be taken into consideration.

Methodology

Experimental side (about 30% of total time) includes using a powder rheometer with aeration and a fluidized bed system. The objective of performing experiments is the model validation. The model part (about 70% of total time) will be done using CFD-DEM (computational fluid dynamics for the fluid side coupled with discrete element model for the powder particles). Alternative approaches may be proposed!



Figure 1 – Plasma coater prototype (Partix)

Objectives of the thesis

You will set up a CFD-DEM model and perform experiments to study in detail the drag and interparticle contact forces.

This project is embedded in a project aiming to study coating processes, specifically using cold plasma technology for dry coating of powders. The project partners include MPG, Procept, Janssen pharmaceuticals, Eastman, Soudal, VITO, U. Antwerpen and KU Leuven, and the student will have the chance to present their work to the project partners.

