# CFD MODELLING OF ELECTROSTATIC CHARGE GENERATION IN GAS-SOLID FLUIDIZED BED-A PRELIMINARY WORK

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Gas-solid fluidized beds have been developed for a large variety of industrial applications, which include polymerization, combustion, drying, etc. The solid particles in this flow system tend to generate electrostatic charges due to particle-particle and particle-wall interactions. Particularly in the case of polymerization fluidized beds, the electrostatic charge generation results in particles collecting on the reactor walls. This accumulation of particles might instigate wall fouling (known as “sheeting”) and consequently force a reactor shutdown for clean-up. Although the fluid bed electrification has been experimentally investigated, its computational fluid dynamic (CFD) modeling has received limited attention. Previously, in a work conducted by Rokkam et al. (1) an Euler-Euler multi-fluid and electrostatic model was used to simulate laboratory-scale experiments on electrostatics. In that work, the CFD model used experimentally measured particles charge-to-mass ratio (q/m) as an input for the simulation. In the present work, the electrostatic model is modified to simulate charge generation due to particle interactions. Single particle contact experiments are conducted to obtain charge generation values and used as an input to an Euler-Lagrange model accounting for electrostatics. The goal is to obtain simulated values of electrostatic charge of particles which are comparable to measurements from laboratory-scaled fluidized bed experiments.

REFERENCES

1. R. G. Rokkam, A. Sowinski, R.O. Fox, P. Mehrani, and M.E. Muhle, Computational and experimental study of electrostatics in gas-solid polymerization fluidized beds. Chemical Engineering Science, 92: 146–156, 2013.