Contribution ID: **490**

Type: **Poster**

Drying characteristics of polydisperse particle aggregates in the capillary-dominated regime

Thursday, 17 May 2018 12:15 (15 minutes)

In this study, a discrete pore-scale model is developed to predict the drying characteristics of an aggregate composed of primary particles with a multimodal size distribution. The solid phase is represented by a cubic particle packing and the complementary pore space is constructed by using the pore-scale finite volume approach. The vapor forming as a result of (slow) evaporation escapes through the top surface of a porous particle aggregate. A drying algorithm is implemented that takes into account the formation of liquid clusters and which is based on the combination of the classical invasion percolation algorithm, applied to each cluster, and the computation of the evaporation rate for each cluster. Both capillary liquid flow and vapor diffusion are obtained from a pore-scale finite volume model. Taking a regular mono-sized particle aggregate as a reference, the size and spatial distributions of the primary particles are systematically varied to represent the change in the corresponding void space structure. The simulation results indicate the impact of the spatially correlated pore-scale heterogeneity on the drying kinetics of these particle aggregates. This work is our first step towards simulating the complex thermo-mechanical behavior of particle aggregates during drying.

References

Acceptance of Terms and Conditions

Click here to agree

Primary authors: Mr THAI PHAM, Son (Thermal Process Engineering, Otto von Guericke University); Prof. CHAREYRE , Bruno (3SR, University Grenoble-Alpes; 3SR, CNRS); Prof. TSOTSAS, Evangelos (Otto-von-Guericke University); KHARAGHANI, Abdolreza (Otto von Guericke University)

Presenter: KHARAGHANI, Abdolreza (Otto von Guericke University)

Session Classification: Poster 4

Track Classification: MS 1.05: Drying of porous media from pore to macro scale