

# Dynamics-Conversion coupling analysis of a moving bed by XDEM method

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## ABSTRACT

By the fact that the drying process prior to the biomass combustion leads to energy efficiency improvement, it is a considerable key point in biofuel utilization. The objective of this study is analysis of drying process of wet woody particles in a circulating cylinder including dynamics investigation by implementing a novel approach named eXtended Discrete Element Method (XDEM). In this approach, the particles are resolved as the discrete phase coupled via heat and mass transfer to the surrounding gas phase. The test case is a cylinder rotating with a constant angular velocity including moist wood particles. The moisture content and temperature of particulates inside the circulating cylinder are investigated by evaluating effects of operating parameters such as gas temperature and pressure, cylinder angular velocity and particle size. Finally the simulation results are discussed comparing temperature and moisture content of particulates.

## REFERENCES

- [1] Thermal Conversion of Solid Fuels, B. Peters, WIT press, 2003.
- [2] A. Mahmoudi, F. Hoffmann, B. Peters, "Application of XDEM as a novel approach to predict drying of packed bed", *International Journal of thermal Science*, Vol. 75, pp. 65-75, (2014).