

Simulation of ash transformation process during silica-rich biomass combustion using FactSage

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Abstract:

In this work, ash transformation process during silica-rich biomass combustion was investigated using FactSage 8.0. Raw, blended, and chemically pre-treated rice husk and rice straw were selected as agricultural residues because of their abundance and high potential in biogenic silica production. Chemical and phase composition of the ashes produced at different temperatures were analyzed using spectroscopic and diffractometric techniques, and the experimental results were compared with the simulation results obtained from thermodynamic equilibrium calculations. The results confirmed that FactSage is a powerful tool to predict ash transformation reactions, as well as the slag formation tendency of silica-rich biomass fuels during combustion.

Keywords: Silica-rich biomass, FactSage 8.0, Ash transformation reactions, Slag formation