

## A global equilibrium analysis of co-firing coal and solid recovered fuel - DTU Orbit (09/11/2017)

### A global equilibrium analysis of co-firing coal and solid recovered fuel

Global equilibrium calculations have been performed to study the behavior of ash forming species in cocombustion of a bituminous coal and a solid recovered fuel (SRF). It revealed that co-combustion of coal and 25% SRF (weight basis) could significantly reduce the formation of NaCl (g) and KCl (g) in moderate temperature (800–1000 oC), as compared with that in 100% SRF combustion. The simulation results were compared with the experiment results obtained at the same fuel condition, and qualitative agreements were achieved. Both results suggest that co-combustion of coal and SRF would be a feasible method to increase the electrical efficiency of utilizing waste, as the aluminosilicates content in the coal could mitigate the ash related problems caused by the relative high chlorine and alkali content in the SRF. The influence of different SRF quality on the behavior of co-combustion was evaluated through adding PVC and NaCl to the fuel mixture. Both the simulation and experimental results indicate that formation of NaCl (g) and KCl (g) at temperatures above 1000 oC is significantly increased with the addition of PVC and NaCl. And a large fraction of the formed NaCl (g) and KCl (g) is not converted to aluminosilicates during the flue gas cooling in the experiments, probably due to kinetic limitations. The results suggest that it is important to control the chlorine and alkali content in SRF, in order to facilitate co-combustion of coal and SRF.

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