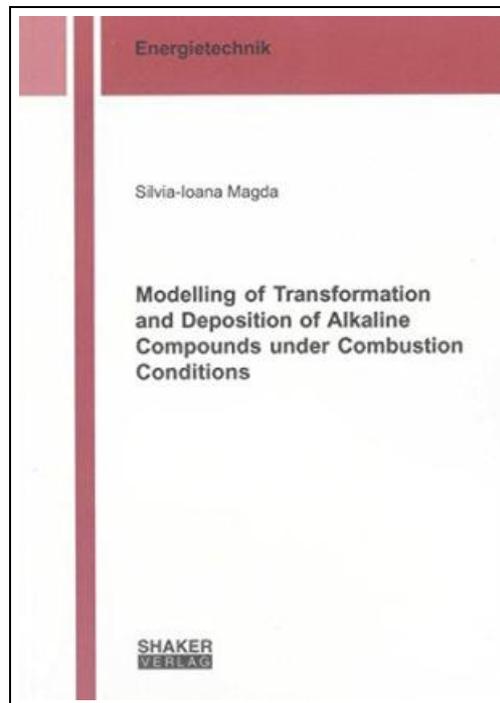


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Shaker Verlag Dez 2012, 2012. Taschenbuch. Condition: Neu. Neuware - In coal fired power plants the mineral matter in coal can lead to operational difficulties, i.e. fouling, slagging and corrosion. In this work, the release and reactions of alkali during combustion of several coals are investigated by modelling at conditions that resemble pulverised coal combustion. The aim is to assess the extent of alkali dependence upon fuel ash composition, combustion temperature and secondary reactions, and to propose sub-models for alkali estimation. Two models for alkali release, based on alkali leaching analysis and chemical form of alkali are proposed. Equilibrium and kinetic studies of interactions between ash compounds show that aluminosilicates have a 'buffering' effect on alkali, thus reducing their release. Ca and Mg enhance alkali release, because they compete for silicates, leaving alkali as more volatile compounds. In absence of kinetic data, the effect of Ca and Mg over alkali-aluminosilicate reactions is taken into account by equilibrium factors. Kinetic and equilibrium calculations suggest that uncertainties in alkali initial form have little effect on alkali flame and post-flame chemistry. Thus, the alkali post-flame chemistry can be estimated based on the char conversion rate, temperature and molar ratios of alkali, chlorine and sulphur within fuel. Equilibrium and kinetic data agree well, with the exception of  $\text{Na}_2\text{SO}_4(\text{g})$  formation - not predicted in significant amount by kinetic modelling for typical post-flame pulverised coal combustion conditions. The speciation data are used as input for calculations of gas-to-particle formation during cooling in the convective pass. Under studied conditions heterogeneous condensation occurring on heat exchanger tubes or particles is much higher than homogeneous condensation. The sub-models are combined into an Euler-Euler Computational Fluid Dynamics analysis tool. A large scale power plant is simulated. Three film formation models from literature are used to compute the alkali thickness layer....



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