Investigation of agglomeration behavior of rye and wheat straw during FBC combustion

Abstract:
Straw, as by-product of the agricultural production, could be considered an attractive renewable fuel. However its high alkali and chlorine content are responsible for different technological problems during its combustion. One of the main problems in the case of fluidised bed combustion is the agglomeration of bed particles and defluidisation fo the bed. Aim of this work is to investigate the agglomeration behavior of straw pellets during theris combustion in a small scale fluidised bed reactor. Combustion tests (textasciitilde 7h) were performed in a small-scale fluidised bed reactor (30 kWth) with straw pellets. Three fuels were tested: wheat straw pellets, rye straw pellets and wood pellets as reference. The temperature in the bed was about 800°textdegreeC. EDX analysis of aggleomerates and ash samples were performed. Agglomerates were found in all straw experiments while no agglomerates were observed for the wood tests. In the case of rye straw defluidisation was achieved. Both agglomeration mechanisms coating-induced and melting-induced werde observed. The coating was characterized by high Si and lowerd melting point than ashes and may be the result of ash-bed particles interaction.