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Titel des Beitrags: Continuous in situ measurements of alkali species in the gasification of biomass

Abstract: This work describes the first on-line, in situ measurement of alkali species in biomass gasification using excimer laser induced fragmentation fluorescence (ELIF). Three pelletised biomass fuels were gasified under different operating conditions in a bubbling fluidized-bed reactor, using steam as the gasifying medium. Concentrations of potassium and sodium were measured in real time for several hours per measurement. Average concentrations obtained for potassium ranged from 140 to 350 ppb, and those for sodium ranged from 1.7 to 60 ppb. Also observed was a slow release of alkali after shutting off the fuel feed, which suggests that alkali species had been taken up in the bed material (olivine); this was confirmed by analysing the bed material before and after use. Consideration of the olivine structure/composition and possible interactions with alkali and other elements during gasification suggests that alkali-containing layers could have formed on the bed particles but appear not to form crystalline phases. This may allow for re-release of alkali while the bed is still hot.

Stichworte: Biomass gasification Alkali species In situ measurement