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Titel des Beitrags: Analysis of potential gasification alkali getters using a new high temperature pressurized simultaneous thermal analyzer (P-STA)

Abstract: Hot gas cleaning, especially hot alkali gas cleaning, in integrated gasification combined cycle (IGCC) power plants is a key technology for a better performance of this desirable power plant technology. In this study potential mineral getters were tested for their total temperature dependent chemisorption capacity for alkali compounds under conditions relevant to IGCC power generation systems. For these laboratory tests a benchmark setting pressurized simultaneous thermal analysis (PSTA) device was developed. It allows working pressures ranging from vacuum to 0.6 MPa absolute pressure at a maximum working temperature of 1750 °C and thus conditions far beyond any known pressurized STA systems. The alkali retention potential of a series of three potential getter minerals (mostly aluminosilicates) was identified at temperatures up to 1750 °C in reducing atmospheres. Although silicon-rich aluminosilicates show higher alkali release at temperatures above 1250 °C they seem to offer better retention potential at lower temperatures. The points of maximum release speed are shifted to about 150 °C higher temperatures with pressure increasing from ambient pressure to 0.5 MPa overpressure. Thermochemical calculations showed acceptable agreement with experiments. The release fraction of sodium can theoretically be reduced by around 40%

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