

Biomass gasification in bubbling fluidized bed: behaviour of inorganics at high temperature and their interaction with bed material

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Biomass is attractive substitute to fossil fuels but its inorganics can interact with bed material during fluidized bed gasification and lead to agglomeration and defluidization [1, 2]. The aim of this study is to evaluate inorganic phase transformation and interaction with bed material during thermal processes of miscanthus. The fundamental aspects of this work can help to fulfil the gap in predicting methods and to cope with the difficulty of detecting and quantifying the different chemical phases during ash formation and gasification.

The main inorganics in ash are Si, K, Ca, Mg, P, S and Cl. Difficulties on the characterisation are, among others, the small quantity of available sample, the coexistent of vitreous and crystalline phases and the fact that the inorganics are also present in the form of

phosphate, sulphate, chloride and silicate besides oxide. Samples were analysed by TGA, ICP-MS, XRD and SEM-EDS. Each analytical technique gives important but not complete information about the transformation of minerals. Their combination with thermodynamic calculation can bring us closer to the understanding of the complex phenomena of ash melting.

References

1. M. Bartels, W. Lin, J. Nijenhuis, F. Kapteijn, J.R. van Ommen, *Prog. Energ. Combust.* **34** 633 (2008)
2. M. Öhman, L. Pommer, A. Nordin, *Energ. Fuel* **19** 1748 (2005)