

Hydrothermal conversion of saccharose in water from ambient to supercritical conditions – an in situ Raman analysis

Tobias C. Klima^{a,b}, Andreas Siegfried Braeuer^{a*}

^a Technische Universität Bergakademie Freiberg, Institut für Thermische Verfahrenstechnik,
Umwelt- und Naturstoffverfahrenstechnik, Freiberg, Germany;

^b Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Erlangen Graduate School in
Advanced Optical Technologies (SAOT), Erlangen, Germany

Andreas.Braeuer@fau.de

We report on a glass capillary experiment that can resist pressure up to 25 MPa at temperatures up to 700 K. A fluid (single-phase or multi-phase) can be pumped through the capillary system at stationary conditions, while the fluid under isobaric conditions is heated to hydrothermal or up to supercritical conditions (with respect to water). As the capillary is made of glass, optical access is granted to the fluid.

We pumped an aqueous solution of saccharose (sugar solution) through the capillary system and analyzed in situ with Raman spectroscopy how saccharose molecules under hydrothermal treatment are converted into other species. The experimental results we report are our first measurements made into the direction of the analysis of the hydrothermal conversion of biomass.