183c Characteristics of Biomass Pretreatments

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For the first time, a single source of cellulosic biomass was pretreated by leading pretreatment technologies using identical analytical methods to provide comparative, high quality performance data. In particular, ammonia explosion, aqueous ammonia recycle, controlled pH, dilute acid, flowthrough, lime, and uncatalyzed hydrolysis approaches were applied to prepare corn stover for subsequent biological conversion to sugars through a Biomass Refining Consortium for Applied Fundamentals and Innovation (CAFI) among Auburn University, Dartmouth College, Michigan State University, the National Renewable Energy Laboratory, Purdue University and Texas A&M University.

This presentation summarizes the technical and selected performance characteristics of the various pretreatments studied. Flowsheets are used to describe each of the pretreatments and to summarize chemical inputs and pretreatment conditions. These pretreatments range from highly acidic to essentially neutral to strongly basic and from very high water concentrations to essentially dry systems. Other variations include temperature ranges from slightly above ambient to over 200 0C, pressures from ambient to approximately 300 psia and treatment times from a few minutes to a few months. Therefore there is an enormous range of pretreatment conditions studied in the CAFI, giving rise to a wide variety of responses that are documented in our research.