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FRACTIONATION OF ALKALINE PULPING LIQUORS FOR FUEL AND CHEMICAL PRODUCTION

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Currently, North American pulp mills are in a period of decreased profitability and consolidation due to a number of economic factors and the development of processes and technologies for new value-added products from existing process streams should be an important focus for this industry to remain competitive. In existing kraft chemical pulp mill designs, solubilized lignin and hemicellulose are typically concentrated and combusted to produce steam and electricity and to recover the pulping chemicals. There still exists a very large potential for other more profitable applications of the hemicellulose and lignin fractions of the biomass which can provide the mill with a more diverse product portfolio.

Based on the new chemical properties of these hemicelluloses and lignins, there are important implications for process separations based on solubility for example in different solvents and at different pH values. To understand these separations, it is important to understand the physical properties of these biopolymers in solution and equilibrium behavior and crystallization dynamics including interactions between phases.

The purpose of this work is to investigate the potential of technologies that integrate alkaline chemical pulping with hemicellulose and lignin extraction, recovery, and utilization as feedstocks for higher value products such as solid fuels and polymer building blocks. The potential applications that are to be addressed and developed in this work have a strong industrial relevance.

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