

## ABSTRACT

DAI, QIZHOU. Influence of Extractives on the Bleachability of Batch Extended Delignified Kraft Pulps. (Under the direction of Dr. Hou-min Chang and Dr. Hasan Jameel).

The purpose of this research was to study the effect of pretreatment on the extractive content and bleachability of extended delignified kraft pulps. The studies were carried out on both southern hardwood and southern softwood species. It was found that the extractives affected the bleachability of pulps by reaction and blocking mechanisms. For hardwood pulps, the reaction of extractives with bleaching chemicals was more significant. For softwood, the blocking effect of extractives was more pronounced. During the batch extended delignification process, the extractives were accumulated and precipitated on the pulps due to the black liquor recycling. The amount of precipitates was determined by the pretreatment conditions. It was possible to lower the extractive content of both the softwood and hardwood pulps by introducing a gas-off process in the pretreatment stage of a batch extended delignification process. The removal efficiency of extractives was affected by the gas-off process and the extractive distribution. The amount of extractives that was removed by the gas-off process was affected by the pretreatment operational conditions and the volatility of the extractives. The distribution of the extractives in the digester was also affected by the operational conditions. For the softwood,

the natural extractives were comparatively volatile. It was possible to perform the gas-off under a high temperature and a high pH of the system. For the hardwood, the natural extractives were not volatile. High temperature and high pH were the ideal gas-off conditions. Apart from the extractive content, the fiber morphology also affected the bleachability of kraft pulps. For the softwood, the earlywood was easier to cook than the latewood. With the same kappa number, the final brightness of the earlywood pulp was at least 2% ISO higher than the latewood pulp because of the thinner fiber wall and faster leaching rate.