

Depolymerization of Concentrated Sulfuric Acid Hydrolysis Lignin in Subcritical Water and Supercritical Methanol Basic Solvents

Marcel Jonathan Hidajat, 김재훈[†]

성균관대학교

(jaehoonkim@skku.edu[†])

The aim of this work is to explore the effect of the different bases as well as the different media in concentrated sulfuric acid hydrolysis lignin (CSAHL) depolymerization. The bases used here were NaOH, KOH and Na₂CO₃. NaOH and KOH gave 15.7 wt% monomeric yield in subH₂O–basic media with 10 wt% of base catalyst based on the lignin weight. In scMeOH, KOH gave the highest yield of monomers of 6.61 wt% at the same reaction condition. In water case, the "Solvent Cage" effect takes the major role in preventing the formation of poly–condensates, which resulted in lower solid residue yield in water than methanol. Catechols and guaiacols were the most abundant product with selectivity up to 22% in water, while the alkoxybenzenes were the most abundant product in methanol solvent due to the methylation of the O–atom of the hydroxyl group of phenols. Comparison with the commercial Kraft Lignin was also conducted and resulted in higher monomeric yield up to 21.55 wt%, showing that CSAHL has a more recalcitrant nature than Kraft Lignin.