

Kinetic study of glucose conversion to 5-hydroxymethylfurfural and levulinic acid catalyzed by sulfuric acid

한석준, 이승민, 전원표, 김태현¹, 김준석[†]

경기대학교; ¹한양대학교

(jskim84@kgu.ac.kr[†])

5-HMF(5-Hydroxymethylfurfural) and LA(levulinic acid) derived from biomass are green platform chemicals, which have a wide of potential applications as biofuels and biochemicals. In this study, the kinetics of LA formation from glucose decomposition with various concentration of sulfuric acid at different temperature was investigated. The experiments were performed in a broad temperature(140-200 °C), using sulfuric acid as the catalyst(1-3%). Glucose solution was made by dissolving 1g of glucose in 10ml of sulfuric acid solution. The reactions rates increased with temperature and activation energy showed a similar tendency to previous reported values. Reaction time for maximum concentration of 5-HMF decreased as the temperature increased. Furthermore, the decomposition of 5-HMF was fast as the acid concentration increased. Reaction time to reach maximum concentration of levulinic acid was reduced as the acid concentration increased. Continuing to raise the temperature decreased the maximum concentration of levulinic acid and increased the amount of humins. On the basis of results, kinetic study provides useful information to achieve high concentration of LA and 5-HMF from biomass.