

Thermogravimetric study on catalytic pyrolysis of biomass species by using Cu-doped alumina

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The Cu/Al₂O₃ catalysts of three different compositions (10, 20 and 30 wt% Cu loading), have been investigated with regard to their catalytic effects on pyrolysis of paper biomass species (up to 800°C) by thermal gravimetric analysis (TGA) experiments. According to the TGA results, the catalysts made devolatilisation at lower temperature regions in the pyrolysis of the biomass species, and the temperature reduction effects follow the order: 30 > 20 > 10 wt% copper loading. At the same time, the amount of residue at the end of the reaction has also been diminished in presence of the catalysts, followed the order: 10 < 20 < 30 wt% copper loading. At lower and middle range of temperatures dehydration reaction enhances more in the presence of more copper loaded catalysts, may be due to the greater oxygen mobility in the catalysts activated with noble metal, and this enhances directly with the catalyst basicity. At higher temperatures, the catalyst with greater copper loaded worked more nicely; may due to the enhancement of the depolymerization reaction over dehydration of cellulose in presence of more basic catalysts. The catalysts were characterized by using XRD, SEM and BET surface area analysis