

Thermal decomposition of microcrystalline cellulose under sub- and supercritical condition of organic solvents

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Thermal decomposition of microcrystalline cellulose was studied in sub/supercritical solvents (as: m-xylene, dodecane, decalin). The effect of hydrogen and nano size magnetite catalyst (Fe_3O_4) on conversion ratio has been investigated at high pressure and temperature reactor. The applied reaction temperature was in the range of 573–723K with and without hydrogen at the initial condition. The liquid products were analyzed by GC–Mass or GC with FID detector. And solid residues were characterized by BET, XRD and TGA. The results showed that the addition of initial H_2 at 623K leads to an increase in conversion ratio about 4–7% in all solvents. The best conversion ratio was observed in decalin at 673K, 35 bar of initial pressure hydrogen and presence of catalyst. Nano size magnetite catalyst contributed drastically to an increase in conversion ratio (27%) at 673K; however it has less effect to the conversion ratio in m-xylene and dodecane solvents.