Responsive Behavior of Regenerated Cellulose in Hydrolysis under Microwave Radiation

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Abstract: This work studied the responsive behavior of regenerated cellulose (RC) in hydrolysis under microwave radiation. Four types of RC with different crystallinity (*Cr*) and degree of polymerization (DP) are produced to evaluate the reactivity of RC by step-by-step hydrolysis. Results show *Cr* is the key factor to affect the reactivity of RCs. With hydrolysis of amorphous region and the formation of recrystallization, the *Cr* of RC reaches a high value and thus weakens the reactivity. As a result, the increment of cellulose conversion and sugar yield gradually reduces. Decrease of the DP of RC is helpful to increase the speed at the onset of hydrolysis and produce high sugar yield. But, there is no direct influence with the reactivity of RC to prolong the time of pretreatment. This research provides an accurate understanding to guide the RC preparation for sugar formation with relative high efficiency under mild reaction conditions.

Keywords: Regenerated cellulose, Responsive behavior, Recrystallization