

Deep insights into the atmospheric Sodium hydroxide-hydrogen peroxide extraction process of hemicellulose in bagasse

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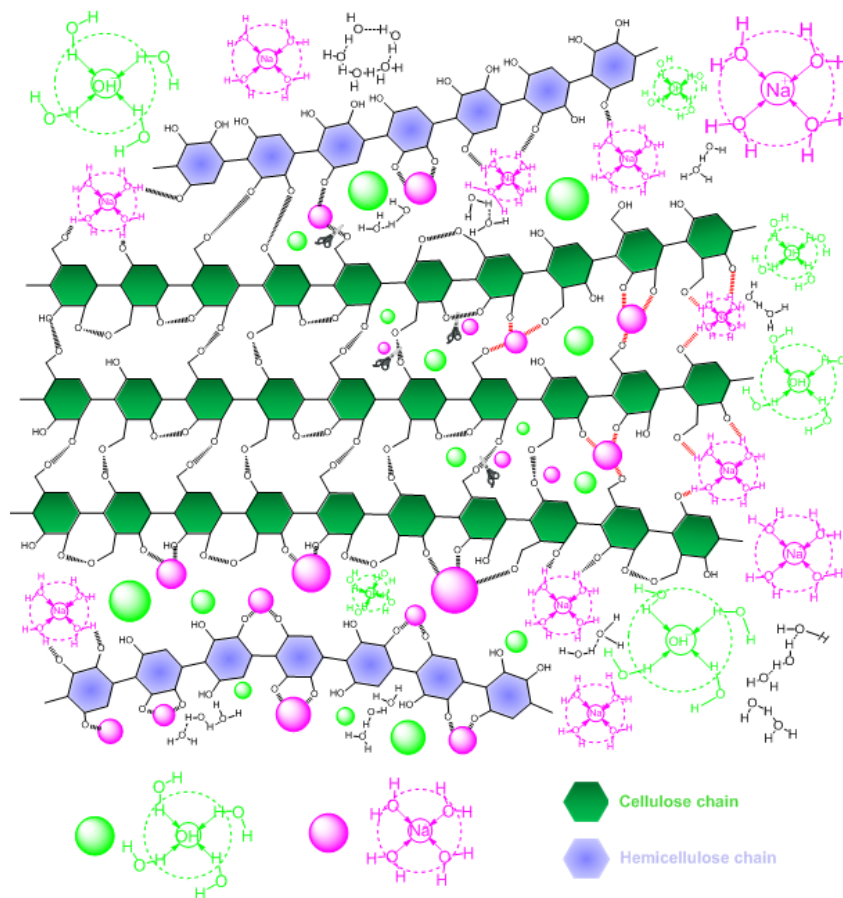
³ Baiyun paper Co. Ltd., Zhumadian,

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Abstract

The alkali dissolution characteristics and mechanism of hemicellulose in bagasse pith have been deeply analyzed. Firstly, the technical uncertainty of alkali-extraction and ethanol-separation process has been evaluated. The results showed that the effects of extraction process by-products (i.e., lignin and ash, etc) could be neglected and directly use ethanol precipitation without pre-neutralization for separation of hemicellulose in lye is reasonable. The kinetic behavior test showed that there exists an optimal alkali concentration (~100g/L) to maximize the extraction yield of hemicellulose, attributing to the ratio of hydrodynamic diameter of hydrates and the intersheet distance of cellulosic microfibrils. The activation energy of 22.19 KJ/mol indicated that the time-dependent dissolution process of hemicellulose could be mainly attributed to a diffusion controlled process. The developed model has been proved to be effective for prediction of hemicellulose concentration in the process-lye of atmospheric NaOH-H₂O₂ extraction of a bagasse pith under the experimental conditions studied.

Graphical abstract



Schematic dissolution of hemicellulose from plant fibrous material during alkali treatment

