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1 **Kinetics and mechanism of hemicelluloses removal from**
2 **cellulosic fibers during the cold caustic extraction process**

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15
16 **Abstract:**

17 The effective separation of hemicelluloses and cellulose is desirable for the
18 production of high-purity cellulose, which is a sustainable raw material for many
19 value-added applications. For this purpose, the kinetics and mechanism of
20 hemicelluloses removal from the cold caustic extraction (CCE) were investigated in the
21 present study. The hemicelluloses removal process consists of: 1) the bulk phase,
22 characteristic of significant hemicelluloses removal; 2) the transition phase,
23 hemicelluloses transferring from the inner to the outer region of the fiber wall, with
24 negligible overall hemicelluloses removal; 3) the residual phase, presenting a weak
25 but continuing hemicelluloses removal. Furthermore, the enzymatic peeling method
26 was adopted to study the fundamentals of hemicelluloses removal. The results showed
27 that the molecular weight of hemicelluloses is the main parameter governing their
28 diffusion/dissolution processes, and that the low molecular weight hemicelluloses are

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