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**Controlling the structure and rheology of TEMPO-oxidized cellulose in zinc chloride aqueous suspensions for fabricating advanced nanopaper** SHA WANG, XIN ZHANG, LIANGBING HU, ROBERT BRIBER, HOWARD WANG, Dept. Materials Science and Engineering, University of Maryland, College Park, LINXIN ZHONG, State Key Laboratory of Pulp and Paper Engineering, South China University of TEchnology — Due to its abundance, low-cost, biocompatibility and renewability, cellulose has become an attractive candidate as a functional material for various advanced applications. A key to novel applications is the control of the structure and rheology of suspensions of fibrous cellulose. Among many different approaches of preparing cellulose suspensions, zinc chloride addition to aqueous suspensions is regarded an effective practice. In this study, effects of  $\text{ZnCl}_2$  concentration on TEMPO-oxidized cellulose (TOC) nanofiber suspensions have been investigated. Highly-transparent cellulose nanofiber suspension can be rapidly obtained by dissolving TOC in 65 wt.% zinc chloride aqueous solutions at room temperature, whereas a transparent zinc ion cross-linked TOC gel could be obtained with zinc chloride concentration as low as 10 wt. %. The structural and rheological characteristics of TOC/ $\text{ZnCl}_2$  suspensions have been measured to correlate to the performance of the transparent and flexible nanocellulose paper subsequently produced via vacuum filtration or wet-casting processes.

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