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Pore-Fiber Transport Dynamics of Aqueous Cosolvent Solutions in Cellulose-based Thin Porous Media

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After inkjet printing onto uncoated and unsized paper, the ink is first imbibed into the interfiber pores and subsequently absorbed by the cellulose fibers. The achievable print quality depends on the rate of this pore-fiber transport. The latter is accompanied by mechanical expansion of the fibers and the paper sheet. Therefore, we systematically monitored the swelling dynamics of several paper types as a function of ink composition by means of four different measurement techniques. Using aqueous cosolvent solutions as model inks, we found an approximately exponential relation of the time scales of porefiber transport with the cosolvent concentration and an approximately linear relation with its molecular weight.

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