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# Interaction of colloids with cellulose nanofibrils in aqueous solution

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Our goal is to fabricate colloidal photonic layers exploiting structural colors in cellulosic materials. The colloidal distribution is a result of the self-assembly of colloidal particles during the drying process after spraying deposition. Therefore, the aim of our experiments is to follow the colloidal layer development during spray coating of colloidal inks used for lay-er formation on nanoporous templates. Cellulose nanofibrils (CNFs) are a wood-based mate-rial with a high aspect ratio (length ~500 nm and small diameter ~5 nm) and a tunable negative surface charge. The aqueous colloidal ink consists of polymer colloids with a completely deuterated and completely protonated and either hydrophobic PMMA core and a cationic hydrophilic PDMAEMA shell. In order to spray these colloids, they were diluted to a final concentration of 0.1 wt in water. The self-assembly of the colloids on CNF films in the wet layer after spray deposition is governed by the colloid-CNF-water interaction. To explore this interaction of the colloids with CNF in the dispersion state typically used for spray coating conditions, we performed small angle neutron scattering (SANS) experiments at D22 of the Institute Laue Langevin (ILL) in Grenoble in cooperation with the Heinz Maier-Leibnitz Zentrum (MLZ). In the fully protonated colloidal suspension, the shape of the colloid nanoparticles can be modeled by a poly disperse core-shell sphere.

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