

Silica based sol-gel coating for precisely fine tune fluid transport in cotton threads and paper

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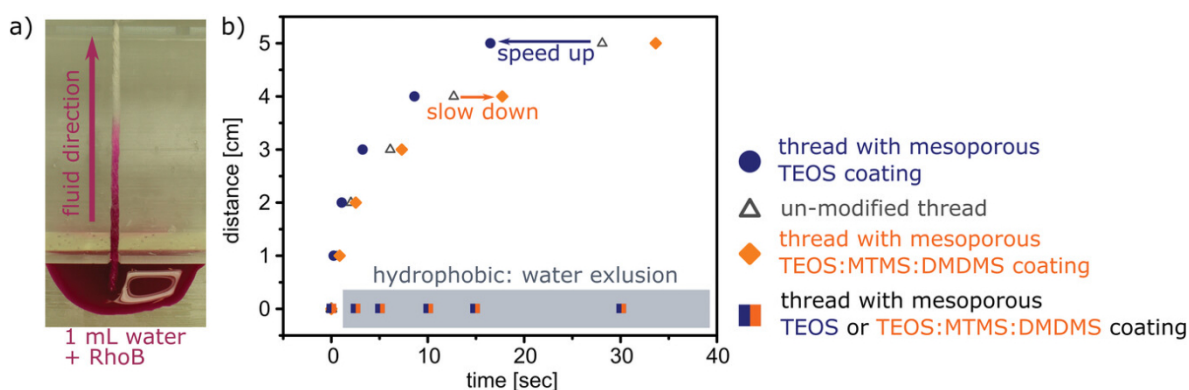
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Controlling fluid transport between different compartment in a communicating cascade reaction is of interest in the context of life-like material and sensor technology. However, currently most systems rely on self-assembly and diffusion process which has limitation in adjusting reaction spaces as well as controlling fluidics resulting in limited variability in controlling the outcome of the reaction network. Based on our work on paper [1, 2] we here present an approach to adjust the fluid speed in cotton threads by applying dense and mesoporous silica coatings onto cotton fibres using sol-gel chemistry and evaporation-induced self-assembly. This silica modification of cotton threads and paper allows to accelerate and decelerate fluid flow. A cotton thread-based fibre library was implemented allowing to knot thread networks with designed fluid flow paths. These thread networks will be investigated with respect to controlling enzymatic cascade reaction networks.

Keywords:

Mesoporous coating, Silica sol-gel, fluid transport



Mesoporous silica coated cotton threads shows higher fluid transport speed than unmodified and MTMS, DMDMS modified threads [3]

References:

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