

Active spatio-temporal control of biomolecular transport systems using stimuli-responsive polymers

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Biomolecular motors operating in engineered environments are promising tools for the setup of highly-efficient molecular sorting and nano-assembly devices. However, reliable methods to specifically control the motor activity by external signals are currently lacking. The project therefore aims to design and test novel strategies to influence the operation of biomolecular transport systems using stimuli-responsive polymers. In particular, we will synthesize functionalized thermo- and photoresponsive polymers to spatio-temporally control the gliding motion of microtubule filaments on surfaces coated with kinesin motor proteins. Among our goals is the starting and stopping of individual microtubule transporters, as well as the generation of reconfigurable kinesin tracks for guided motility. Thus, the project aims to advance the state-of-the-art in switchable bionano hybrid materials and will generate a new class of externally controlled nanotransport systems.

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