CONDUCTIVITY STUDIES OF DIARLYETHYLENE-MODIFIED DNA VIA SCANNING TUNNELING MICROSCOPY

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As the minimization of electronic devices by minimization of classical components gets harder with every product cycle, a turn to molecular electronics becomes inevitable.[1] Double-stranded DNA (dsDNA) is a prime candidate for such an application with its high conductivity along the stacked base pairs and the "built in" isolation through the ribophosphate backbone.[2]

The control of dsDNA assembly by photoswitches or molecular motors is a recently established field, which is still limited to postsynthetic modification or self-complementary strands.[3] Additionally, there have only been melting point measurements of photoswitch-modified dsDNA, while measurements of the conductivity of such systems are still unknown in the literature.[4]

Development of a synthetic route to solid-phase photoswitch-modified DNA building blocks would lead to easily modifiable dsDNA with tunable properties which could be probed via *scanning tunneling microscopy-mechanically controlled break junction* measurements (*STM-MCBJ*).[5]

In the presented work, a synthetic route to such solid-phase diarylethylene-photoswitch-modified DNA building blocks is developed. The synthesized dsDNA will then be studied in via *STM-MCBJ* experiments to determine the effect of an open vs. closed state of the photoswitch.

If successful, the resistance of dsDNA would be switchable, which could prove useful for molecular electronics.[6] With such a system at hand, a photoswitchable binary memory based on dsDNA would be within reach.

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