Conformationally Regulated Molecular Conductance Switching in Arylene-Bridged Bis(Triarylamines)

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Charge transport on the nanoscale has its own intricacies and offers unique opportunities when compared to the macroscopic scale. Of particular interest for the construction of basic components for memory and logic devices are conductance switches, which offer two or more different states.[1]

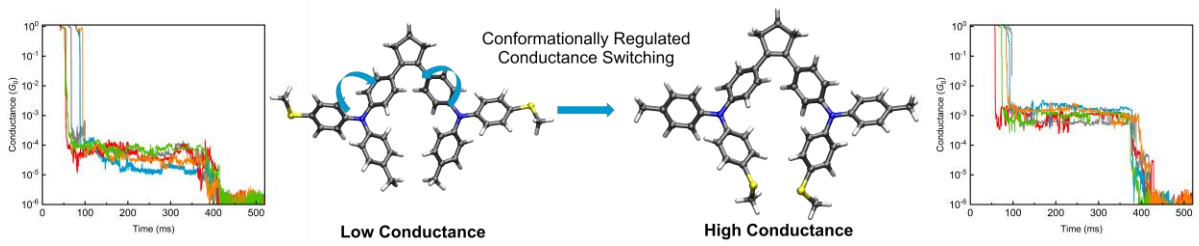

Figure 1: Two different molecular conformations with different S···S distances (middle) with corresponding selected single traces, showing low (left) and high conductance (right).

We have devised and synthesized anchor-group modified bis(triarylamines), as exemplarily shown in Figure 1, which feature different degrees of rotational flexibility encoded in their molecular backbone and compared their molecular conductance characteristics. The latter were measured by means of a custom-built scanning tunneling microscope, according to an established design and protocol.[2] We present evidence for a conformationally regulated conductance dualism in molecular structures of appropriate rotational flexibility, relying on different charge transport pathways across the molecular junction.

References:

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