

Foldamers as Reactive Sieves: Reactivity as a Probe of Conformational Flexibility

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A series of *m*-phenyleneethynylene (mPE) oligomers modified with a dimethylaminopyridine (DMAP) unit were treated with methyl sulfonates of various sizes and shapes and the relative reactivities were measured. Oligomers that are long enough to fold and hence capable of binding the methyl sulfonate, experience rate enhancements of 18- to 1600-fold relative to the small molecule analog, depending on the type of alkyl chain attached to the guest. Three different oligomer lengths were studied, with the longest oligomers exhibiting the fastest rate and greatest substrate specificity. Even large, bulky guests show enhanced methylation rates compared to the reference compound. These experiments suggest a seemingly dynamic nature of the binding cavity of the DMAP modified mPE oligomers. Several potential mechanistic models to describe this behavior are discussed.

