

What can we learn from studying single molecules ?

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Abstract

The ability to monitor structure and dynamics of single molecules opens up new perspectives in fundamental research and nanotechnology. I will present basic experimental techniques and discuss the results of investigations of single molecules using three different methodologies: fluorescence [1-4], Raman [5], and scanning tunneling microscopy [6-8]. Our work focuses on tautomerization in porphycene (Fig. 1), a porphyrin isomer with exceptionally strong intramolecular hydrogen bonds. Studies of single porphycene molecules show interconversion between two different tautomeric forms, *trans* and *cis*, a process that could not be observed by experiments performed for bulk samples. It is also possible to exploit tautomerization for extracting information on 3D orientation of a single chromophore [2]. Finally, differences in photostability of single molecules embedded in different polymer matrices [4] will be discussed.

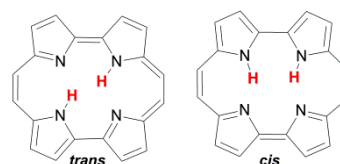


Fig. 1. Tautomeric forms of porphycene.

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