Ultrafast laser spectroscopy of molecular tweezers

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Abstract

Femtosecond laser pulses open new perspectives to the ultrafast science, especially in that they allow controlling and observing molecular materials. Recent studies on molecular nano-crystals showed that pump-probe spectroscopy is an insightful method delivering information on the transient states. The same method was applied to the study of molecular tweezers, we present here.

A molecular tweezer, which is essentially a host-guest pair of molecules, is a simple and efficient model to study and understand molecular recognition and self-assembly by π - π interaction. These non-covalent and hydrophobic interactions are involved in material science, catalysis and especially in biological processes and medical chemistry. A more recent and promising application of host-guest recognition is the design of molecular machines. In this context we have studied Pi0 and TNF complex with ultrafast laser spectroscopy, with the main goal being to reveal the mechanisms leading to the locking and unlocking of the guest by the host. The long term goal would be the laser control of such and related processes, and also design of functionalizable molecular tweezers.

References

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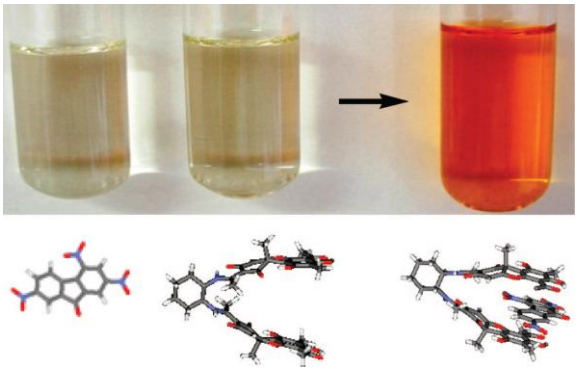
Figure



Molecular tweezer synthetized with (1*R*,2*R*)-1,2-diaminocyclohexane as spacer and two molecules of (+)-usnic acid as pincers [4].