

For many years chemists dream was to track reactions initiated by light occurring in ultra-fast time scale. An example of such reaction is a ring closure in diarylethenes that occurs upon illumination of the sample with UV light. This reaction may be reversed if closed-ring form will be illuminated with visible light. Thanks to this property diarylethenes have potential applications such as optomechanical devices (photoswitches) or dyes used in optical storage devices. In the project femtosecond transient absorption technique employing laser probe beam in infra-red spectral range will be employed for the first time to investigate ring closure/opening reaction. This will allow us to determine rate constants of studied reactions with greater accuracy than it has been done using alternative techniques by other research groups, as well as to characterize short-lived reaction intermediates and to propose which vibrations of molecules excited by light can initiate reaction. These important findings will significantly expand the knowledge regarding mechanism of studied reactions as well as provide feedback for chemists involved in design of compounds with similar properties. For instance, it will be possible to design a compound having a molecular structure that will allow to control a reaction in a desirable way, for instance to control kinetics and efficiency of photoproducts formation.