Ultrafast Laser Photolysis Studies on Multiphoton-gated Photochromic Reactions in Diarylenes and Fulgides.

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Abstract

The instant property change in photochromic systems has been attracting much attention not only from the viewpoint of the fundamental chemical reaction processes but also from the application to optoelectronic devices such as re writable optical memory and switches. The photochromic compound for actual application requires non-destructive readout capability while reading via photo-absorption, which is not compatible with high sensitivity of the system. Hence, gated function such as suppression or promotion of the reaction is required. Introduction of photo-gated functionality is an effective way because the light irradiation can lead to the quick response and we can set various excitation conditions that are independent of the molecular systems. Along this line, we have studied the multiphoton-induced enhancement of cycloreversion reaction in photochromic diarylethene and fulgide derivatives, which can be potentially applicable to the realization of the non-destructive readout capability.

In the seminar, we will introduce the multiphoton gated cycloreversion (ring-opening) reactions in diarylethene[1] and fulgide [2] derivatives in various phases such as in solution, polymers, and crystalline phase. By introducing the dependence of the reactions on the laser pulse durations, excitation wavelength, time interval between two excitation pulses, molecular symmetry of the photochromic systems etc., the mechanisms of the multiphoton-gated reaction will be discussed.

References
