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Photoionization and *trans*-to-*cis* isomerization of β-cyclodextrin-encapsulated azobenzene induced by two-color two-laser-pulse excitation

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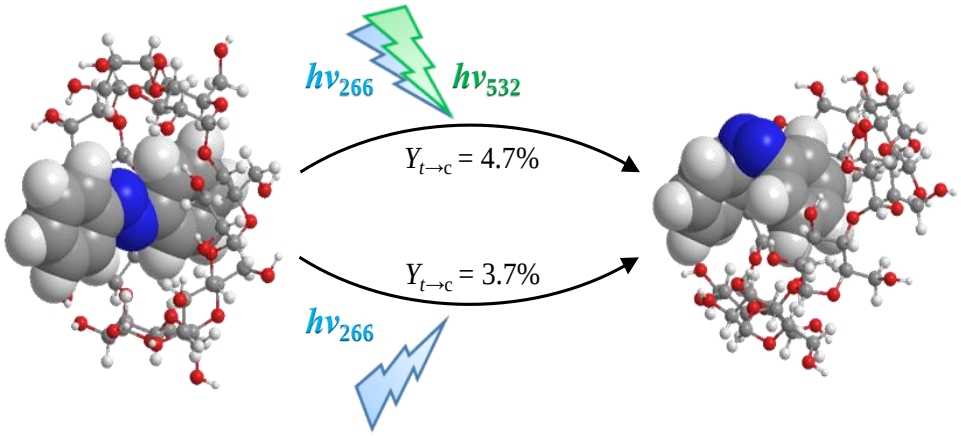
Abstract



Azobenzene (**1**) and the complex resulting from the incorporation of **1** with cyclodextrin (**1**/CD) are attractive for light-driven applications such as micromachining and chemical biology tools. The highly sensitive photoresponse of **1** is crucial for light-driven applications containing both **1** and **1**/CD to reach their full potential. In this study, we investigated the photoionization and *trans*-to-*cis* isomerization of **1**/CD induced by one- and two-color two-laser pulse excitation. Photoionization of **1**/CD, which was induced by stepwise two-photon absorption, was observed using laser pulse excitation at 266 nm. Additionally, simultaneous irradiation with 266 and 532 nm laser pulses increased the *trans*-to-*cis* isomerization yield ($Y_{t\rightarrow c}$) by 27%. It was concluded that the increase in $Y_{t\rightarrow c}$ was caused by the occurrence of *trans*-to-*cis* isomerization in the higher-energy singlet state (S_n), which was reached by $S_1 \rightarrow S_n$ transition induced by laser pulse