

Abstract

Azobenzene is one of the robust photoswitchable molecules, which can be switched between trans and cis isomers. Trans isomer of azobenzene is thermodynamically stable and is having a planar structure, whereas the cis isomer is having a non-planar structure. Upon UV light irradiation, the former can be converted into latter. The cis isomer, on the other hand can come back to trans either by visible light irradiation or under thermal condition with certain half-life. Both switching rate and half-life of reverse switching will be influenced by substituents. In our current research, we are trying to develop a photoswitchable molecular transporter. The underline principle in this regard is to introduce multiple azobenzenes (with different substituents) to a core moiety through various linkages in such a way that all of them upon switching from trans to cis, it can create a three dimensional space, which can be utilized for holding (encapsulation) and releasing (delivery) of the guest molecule. This can be reversibly done by varying the irradiation wavelength. In this regard, we attempted to connect azobenzenes with benzene (trifunctionalization at 1, 3, 5-positions in benzene) through different linkages. Apart from that the linear extension of π -conjugation can be a viable strategy for making molecular wires. Since azobenzene can be switched, the conducting properties can also be altered when it is switched from trans to cis. In this regard, we also attempted in extending the chain length of azobenzenes through azofunctionalization using active methylene compounds. The synthetic attempts towards functionalization of azobenzene as a molecular transporter and also a molecular wire will be presented in this work.