

Abstract

Azobenzene is a photoswitchable molecule, which can switch between thermodynamically stable trans and kinetically stable cis geometrical isomers. Trans isomer is having a planar (2-D) structure, whereas the cis isomer is having a non-planar (3-D) structure, both of them can be interconverted between each other using UV light irradiation and visible light irradiation. Besides, the reverse reaction can happen under thermal condition with certain half-life. The switching rates as well as the half-life of reverse switching are influenced by substituents on the azobenzene molecules. In our current work, we are trying to make multiple azobenzene connected molecules (with different substitution on azobenzene), which can be used as a molecular transporter. In this regard, we are trying to connect multiple azobenzene molecules to a core moiety through various linkages in such a way that upon UV light irradiation, they all can switch together from trans to cis to form a three dimensional cage like structure, which can be utilized for holding and releasing of the guest molecule. Apart from that, we are also trying to synthesize some azobenzene based switchable ligands. The development of transition metal complexes with ligands containing different photochromic families has received great attention in recent years. The photochromic properties can be perturbed by external stimuli, i.e. light, which can lead to variation in the ligand strength, which in turn can cause spin crossover. In order to achieve the above two applications, few molecules with multiple azobenzene functionalization have been designed and targeted for synthesis. The current status and photoswitching studies on those resulting molecules are part of the thesis.