

## Synthesis and Photophysical Properties of Asymmetric Bithiazoyl-Based Diarylethenes: A Potential Ligand for Metal Complex-Based Smart Catalysts

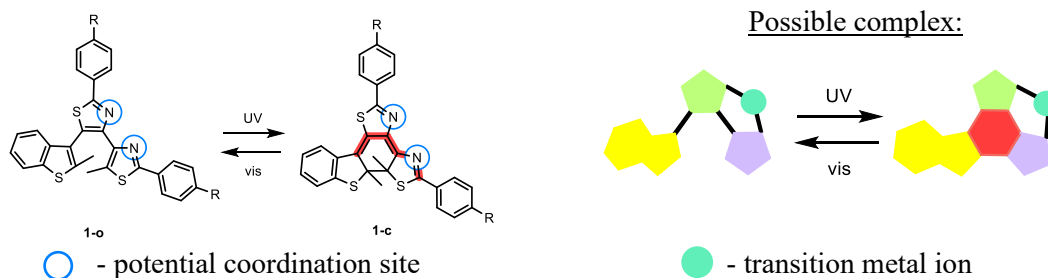
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Diarylethenes (DAEs) are a class of molecular photoswitches that undergo reversible 6 $\pi$  electrocyclic ring-opening/ring-cyclization reactions. They differentiate **o/c** photoisomers in their photophysical properties, which has been probed extensively and served as baseline data in developing more robust DAEs of greater photocyclization efficiency, thermal and fatigue resistance<sup>[1]</sup>. This also led to the exploration of all possible applications of DAEs through intricate molecular design, one of which is ligands for transition metal complexes.

Through coordinate covalent bonding, DAE-metal complexes can yield distinct and interesting properties exclusive to the complex formed through metal-to-ligand or ligand-to-metal charge transfer. As such, DAE-metal complexes have been used in a plethora of applications, including molecular cages, metal-organic frameworks, sensors, and photoswitchable catalysts<sup>[2]</sup>.

Several examples of photoswitchable catalysts based on DAE-metal complexes have been developed, but most of them only exhibit an on/off modulation of the catalytic activity, often with small differences between photoisomers. In this work, we have synthesized a series of asymmetric DAEs with potential multidenticity and studied their photophysical properties. With their potential coordination sites located both above and on the side of the ethylene backbone, it is our hypothesis that the geometric and electronic differences between the photoisomers will have a greater influence on the potential complex as a whole, which can lead to a better-modulated photoswitchable catalyst.



- [1] M. Irie, T. Fukaminato, K. Matsuda, S. Kobatake, *Chem. Rev.* **2014**, *114*, 12174–12277.
- [2] E. C. Harvey, B. L. Feringa, J. G. Vos, W. R. Browne, M. T. Pryce, *Coord. Chem. Rev.* **2015**, *282–283*, 77–86.