**Photo-isomerization Studies of Para-Substituted Arylazopyrazole Photoswitches**

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Light-responsive molecular switches are powerful tools for controlling chemical and physical processes with high spatial and temporal precision. Among these systems, arylazopyrazoles (**AAPs**) have emerged as an advanced class of photoswitches that exhibit superior photochemical performance compared to traditional azobenzene derivatives. Arylazopyrazoles consist of an azo (–N=N–) linkage connecting an aryl ring to a pyrazole heterocycle, a structural modification that enhances photoisomerization efficiency, improves thermal stability of the cis isomer, and enables near-quantitative photoconversion between isomeric states. These compounds characteristically display strong π-π* absorption bands in the UV region, weaker n-π* transitions in the visible region, high molar absorptivity, and tunable electronic properties arising from extended conjugation and heterocyclic substitution. This work examines the synthesis and reversible photoswitching behavior of para-bromo (**Br-AAP**) and 1,8-naphthalimide functionalized arylazopyrazole (**NI-AAP**) based molecular switches. The reversible photo-isomerization properties of the new compounds were characterized by UV–vis absorption spectroscopy. The results show that the bromo substituted small molecular switches exhibit efficient reversible trans-to-cis isomerization upon alternating irradiation with UV (λ = 365 nm) and green (λ = 530 nm). However, the 1,8-naphthalimide substituted compound displays a partial light-triggered reversible isomerization, suggesting that in the presence of large substituent the photo-isomerization process was significantly suppressed. These initial findings establish clear structure–optical property relationships and confirm the suitability of AAP-based systems as tunable, high-performance molecular photoswitches for advanced photochemical and materials applications.