Switching It Up: Enhancing the Photochromic Behavior of Imines

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Molecules and materials comprised of dynamic-covalent imine bonds display a myriad of desirable properties including stimuli-responsiveness, recyclability, and effortless preparation, among others. One frequently overlooked property of imines is their photochromism. While the *E*/*Z* photoisomerism of arylimines has been known for decades, it has been unexplored relative to their azo-based counterparts. This is attributed to their suboptimal photoswitching properties (Figure 1a).[1] Inspired by these recent advancements in azo-based photoswitches[2] and the timeliness of light-controlled systems, we turned our attention to the relatively over-looked imine photoswitches.

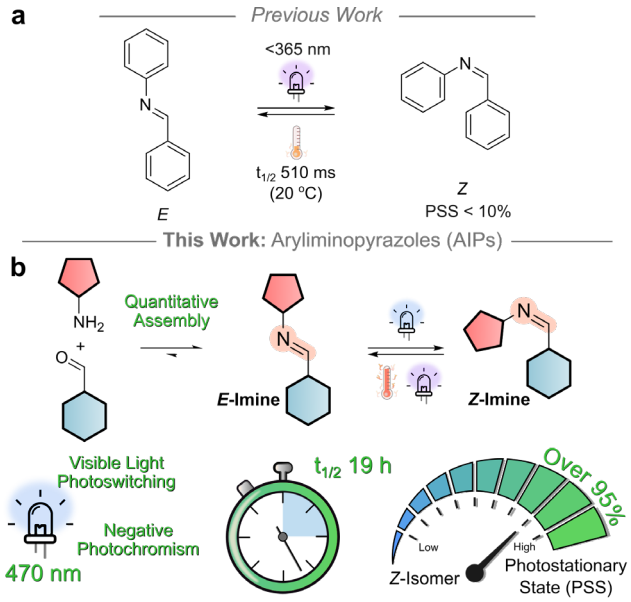

Figure 1: Overview of properties of a) previously reported imine photoswitches[1] and b) the improved (AIPs).[3]

We have overcome the previous limitations of imine-based photoswitches by replacing one of the phenyl rings with a heteroarene, affording a novel class of photoswitch, the aryliminopyrazoles (AIPs, Figure 1b).[3] Our findings open avenues for next-generation photoresponsive dynamic-covalent materials driven solely by these new photochromic linkages and we hope to impart light-responsiveness to existing imine-based materials.

References:

[1] Y. Luo, M. Utecht, J. Dokić, S. Korchak, H.-M M. Vieth, R. Haag, P. Saalfrank, *ChemPhysChem*, **2011**, *12*, 2311–2321.

[2] S. Crespi, N. A. Simeth, B. König, *Nat. Rev. Chem.*, **2019**, *3*, 133–146.

[3] J. Wu, L. Kreimendahl, S. Tao, O. Anhalt, J. L. Greenfield, *Submitted*, **2023**.