

Aromatic Metamorphosis

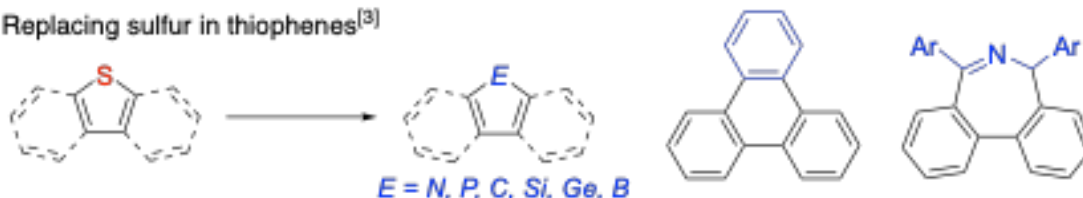
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Abstract

Aromatic skeletons are generally resistant to cleavage due to their high stabilization energy and strong endocyclic bonds. While exocyclic functionalizations are well explored, endocyclic modifications via partial disassembly and ring reconstruction remain less studied. Here, I disclose our efforts to establish 'aromatic metamorphosis',^[1] a strategy that transforms common aromatic compounds such as thiophenes, benzofurans, and indoles into distinct ring systems through multi-step or ideally single-step processes. Aromatic metamorphosis, or what we may now call skeletal editing^[2] of an aromatic ring, challenges traditional frameworks in organic chemistry and provides new efficient or sustainable tools for synthesizing otherwise inaccessible heterocycles and generating chemical libraries with diverse endocyclic frameworks.^[3,4]

Replacing sulfur in thiophenes^[3]



Boron insertion^[4]



References

- [1] a) H. Yorimitsu, D. Vasu, M. Bhanuchandra, K. Murakami, A. Osuka, *Synlett* **2016**, 27, 1765; b) K. Nogi, H. Yorimitsu, *Chem. Commun.* **2017**, 53, 4055. c) H. Yorimitsu, *Acc. Chem. Res.* **2025**, 58, 1323.
- [2] a) J. Jurczyk, J. Woo, S. F. Kim, B. D. Dherange, R. Sarpong, M. D. Levin, *Nat. Synth.* **2022**, 1, 352; b) B. W. Joynson, L. T. Ball, *Helv. Chim. Acta* **2023**, 106, e202200182.
- [3] a) D. Vasu, H. Yorimitsu, A. Osuka, *Angew. Chem. Int. Ed.* **2015**, 54, 7162; b) M. Bhanuchandra, K. Murakami, D. Vasu, H. Yorimitsu, A. Osuka, *Angew. Chem. Int. Ed.* **2015**, 54, 10234; c) A. Kaga, K. Nogi, H. Yorimitsu, *Chem. Eur. J.* **2019**, 25, 14780; d) M. Bhanuchandra, H. Yorimitsu, A. Osuka, *Org. Lett.* **2016**, 18, 384; e) M. Onoda, Y. Koyanagi, H. Saito, M. Bhanuchandra, Y. Matano, H. Yorimitsu, *Asian J. Org. Chem.* **2017**, 6, 257; f) T. Furukawa, T. Yanagi, A. Kaga, H. Saito, H. Yorimitsu, *Helv. Chim. Acta* **2021**, 104, e202100195; g) T. Yanagi, T. Tanaka, H. Yorimitsu, *Chem. Sci.* **2021**, 12, 2784.
- [4] a) H. Saito, S. Otsuka, K. Nogi, H. Yorimitsu, *J. Am. Chem. Soc.* **2016**, 138, 15315; b) S. Tsuchiya, H. Saito, K. Nogi, H. Yorimitsu, *Org. Lett.* **2017**, 19, 5557; c) S. Tsuchiya, H. Saito, K. Nogi, H. Yorimitsu, *Org. Lett.* **2019**, 21, 3855.