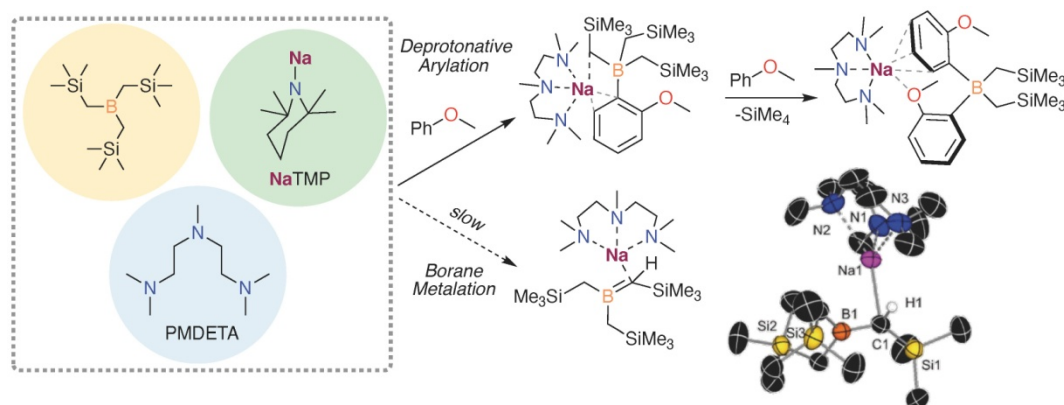


# HARNESSING COORDINATION AND COOPERATIVE EFFECTS TO TAME ORGANOSODIUM CHEMISTRY

Eva Hevia

Department of Chemistry, Biochemistry and Pharmacy, University of Bern  
Freiestrasse 3, 3012 Bern (Switzerland)  
eva.hevia@unibe.ch

Organosodium compounds have attracted the attention of the scientific community in recent years as an alternative to widely used organolithium reagents.<sup>[1]</sup> Lithium alkyls and amides reside at the front of organometallic synthesis as key players in countless transformations, owing to their availability, substantial stability and solubility in hydrocarbon solvents. However, these desirable traits are often pitfalls of heavier alkali-metal organometallics, meaning that their applications have remained underexplored. While recent reports have hinted at the untapped potential of these reagents,<sup>[3]</sup> the constitution of the organometallic intermediates that operate in these reactions has been overlooked, missing an opportunity to tackle their high reactivity and improve their poor solubility. Filling this gap in the knowledge, the preparation of organosodium compounds soluble in hydrocarbon solvents and the isolation and characterization of reactive sodium organometallic intermediates in the solid state and in solution have allowed the development of new protocols for the functionalization of organic molecules. Our efforts have been focused on selective deprotonative metalation reactions of synthetically attractive arenes, providing access to the selective functionalization of these scaffolds, including the borylation<sup>[3]</sup> and the perdeuteration of aromatic scaffolds,<sup>[4a]</sup> and the arylation of toluene derivatives via selective benzylic metalation<sup>[4b]</sup> Coordination effects underpin the observed reactivities and selectivities of these organosodium reagents which in some cases differ significantly from those displayed by their lithium analogues, opening new vistas in the use of polar organometallic reagents for the functionalization of organic molecules.



[1] P. B. De, S. Asako, L. Ilies, *Synthesis* **2021**, 53, 3180–3192.

[2] S. Asako, H. Nakajima, K. Takai, *Nat Catal* **2019**, 2, 297–303.

[3] (a) L. J. Bole, A. Tortajada, E. Hevia *Angew. Chem. Int. Ed.* **2022**, 61, e202204262.

(b) A. Tortajada, L. J. Bole, M. Mu, M. Stanford, M. Peñas-Defrutos, M. Garcia-Melchor, E. Hevia *Chem. Sci.* **2023**, 14, 6538.

[4] (a) A. Tortajada, E. Hevia *J. Am. Chem. Soc.* **2022**, 144, 20237–20242.

(b) D.E. Anderson, A. Tortajada, E. Hevia *Angew. Chem. Int. Ed.* **2023**, 62, e202218498.