

ELECTROCHEMICAL HYDROBORATION OF ALKYNES



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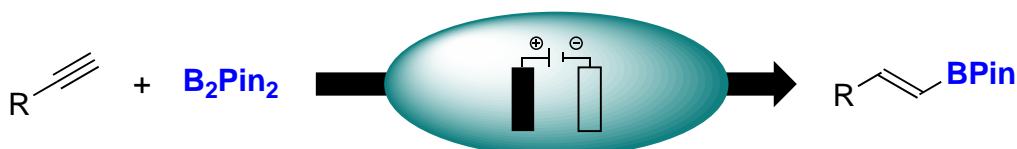
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In the realm of organic synthesis organoboron compounds play an important role to build up complex molecules.¹ These key building blocks showcase various and specific reactivities, which provide them a pivotal role in the arsenal of organic chemists to design retrosynthetic disconnections.² Among the synthetically useful reactions, the hydroboration of an alkene or an alkyne is of paramount interest and has been widely studied for almost half a century.³

In parallel, the chemistry of boryl radicals was recently highlighted as a straightforward alternative to introduce a boron residue.⁴ Importantly, in contrast to the formation of boryl radicals from NHC-borane, their formation from diboron compounds remains scarce.⁵

It is why we reported the electrochemical hydroboration of alkynes by using B_2Pin_2 as the boron source.⁶ This unprecedented reaction manifold was applied to a broad range of alkynes, giving the hydroboration products in good to excellent yields without the need of a metal catalyst or a hydride source. This transformation relied on the possible electrochemical oxidation of an in situ formed borate. This anodic oxidation performed in an undivided cell allowed the formation of a putative boryl radical, which reacted on the alkyne.



Electrochemical Hydroboration

- ✓ No catalyst
- ✓ High functional group tolerance
- ✓ Boryl radical intermediate
- ✓ 42 Examples (up to 92% yield)
- ✓ High diastereoselectivities
- ✓ Practical reaction conditions

References

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