Preparation of Alkylmagnesium Reagents from Alkenes through Hydroboration and Boron–Magnesium Exchange


Significance: A novel method for preparing alkylmagnesium reagents has been disclosed. Alkenes undergo a hydroboration with subsequent boron–magnesium exchange to yield the corresponding primary and secondary alkylmagnesium reagents. These organometallic reagents can be used in a wide range of carbon–carbon bond-forming reactions.

Comment: The key for an efficient boron–magnesium exchange is the use of a pinacolborolane and a 1,4-dimagnesium reagent. The byproducts formed in the course of the exchange reaction did not disturb various subsequent reactions like alkylations, 1,2-additions as well as transition-metal-catalyzed cross-coupling reactions.

Selected products obtained after trapping of prepared alkylmagnesium reagents:

- n-Oct\text{Ph} (94% yield)
- n-Oct\text{OH} (92% yield)
- n-Oct\text{Ph} (91% yield)
- n-Oct\text{Ph} (91% yield)
- n-Oct\text{CO}_2\text{Et} (84% yield)
- TIPSO\text{CO}_2\text{Et} (83% yield)
- Ph\text{CO}_2\text{Et} (86% yield)
- CO\text{Et} (76% yield)