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The Application of 1,2-Silyl Shift in Synthesis of Pyrrolidine Derivatives from Propargylsilanes

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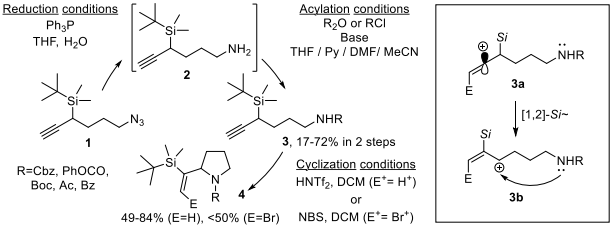
Pyrrolidines are common structural elements in natural products, especially in alkaloids, isolated from plants or microorganisms and exhibiting different biological activities, including antioxidant, anti-inflammatory, antihyperglycemic, antimicrobial, antifungal and anticancer properties.[1] Additionally, pyrrolidine and it's derivatives are often used as transition metal ligands, organocatalysts[2], and chiral controllers in asymmetric synthesis.[1,3]

In this work a new approach towards the synthesis of 2-(1-*tert*-butyldimethylsilyl)vinylpyrrolidines was investigated. By combining Staudinger reduction and subsequent acylation under various conditions, a two-step one-pot process for the synthesis of protected amines **3** from (6-azidohex-1-yn-3-yl)(*tert*-butyl)dimethylsilane (**1**) was designed. Cyclization of propargylsilanes **3** was achieved through electrophilic activation of the alkyne, followed by intramolecular nucleophile attack on the formed carbocation. The proposed intermediates for this transformation are the vinyl carbocation **3a**, which undergoes 1,2-silyl migration, resulting in the more stabilized allylic carbocation **3b**. Finally, an intramolecular nucleophile attacks the formed carbocation **3b**, yielding pyrrolidines **4**.



Scheme 1. Synthesis of 2-(1-*tert*-butyldimethylsilyl)vinylpyrrolidines **4.**

Supervisor: Dr. chem.. M. Turks

References

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