**Discovery Road to Organo-Silicon Compounds: A Review**

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**Introduction**

This part is basically deals with the evolutionary history of silicon complexes. It has many subsections that focus on modified techniques for synthesis of silicon compounds and their analytical applications [1]. The beginning section describes the background framework regarding the organosilatranes research work narrated in this thesis and the inspiration for pursuing this work [2]. Next section illustrates literature review of the existing techniques for the synthesis of silatranes and the manipulation of ‘Click chemistry’ as revolution field for application to organosilicon compounds. Further sections concentrate on the feasible practicable exocyclic substituents that can be bridged to silatranes and their applications in analytical chemistry and a brief overview of the concerning applications of silatranes in chemical, practical and biological fields [3]. General synthetic routes used for the synthesis of triethoxysilanes and structural aspects of silatranes are summarized.

**Synthetic Routes**

Silatranes (also known as *triptych–siloxazolidines*) are penta-coordinated complexes, synthesized via transesterification reaction of trialkanolamines with various organotriethoxysilanes [4]. The structure of a classical silatrane has five membered tricyclic rings forming a tricyclic cage with N(CH₂)₃ and RSiO₃ fragments with N→Si donor–acceptor properties with reactivity much different from normal tetravalent silicon compounds (Scheme 1) [5].

![Scheme 1: Synthetic route of silatrane formation](image-url)
Involvement of Click Chemistry

Next section focus attention on Click chemistry which is highlighted by its modularity, high efficiency and wide functional group tolerance that produce extremely stable 1,2,3-triazole linker [6]. The azide and terminal alkyne fragments are hybridised using Cu(I) as catalyst to synthesize different molecules from smaller fragments [7]. The use of ‘Click Silylation’ approach initiated by Stack et al. in 2008 paved a new methodology for reaction of 3–azidopropyltriethoxysilane (AzPTES) with numerous organic alkynes, substituted with several functionalities, such as amines, N–heterocycle and aromatic carbonyl compounds under thermal conditions to generate triethoxysilanes (Scheme 2) [8].

Scheme 2: Synthesis of 1, 2, 3–triazole linked triethoxysilanes via ‘Click Silylation’

Conclusion

The utility of click chemistry in the various fields have been achieved. These interactions favor the binding of triazoles to biomolecular targets and also improve their solubility [9]. 1, 2, 3-triazole ring can act as a bioisostere of amide moiety resulting in a number of promising antiviral, antibacterial and cytostatic agents with 1, 2, 3-triazole as an amide surrogate. Moreover, 1, 2, 3-triazoles being aromatic heterocyclic compounds are also recognized as suitable isosteres of aromatic rings, particularly heteroaromatic rings and this ring has also found applications as the isostere of double bond [10]. The importance of 1, 2, 3–triazolic compounds in medicinal chemistry is undeniable and it mainly contributed in the following activities like HIV Protease Inhibitors, Anticancer, Antituberculosis, Antifungal and Antibacterial [11]. The last section describes Click chemistry Applications of organotrialkoxy silanes and silatranes in various fields [12].

References


