ORAL DEFENCE ANNOUNCEMENT

MUHAMMAD LUTHFI BIN ISMAIL

SIMPLE SYNTHETIC METHODS TOWARDS REACTIVE LOW VALENT GERMANIUM COMPOUNDS

This thesis describes the unique synthetic strategy towards a variety of low valent, low oxidations state germanium compounds without the use of harsh reagents. Chapter 1 describes the synthesis of a phosphine-stabilized phosphidogermainium(I) dimeric derivative, [Ge(Cl){N(Ar)PPh$_2$}(Ph$_2$P)Ge:}]$_2$ (1.3) isolated from a reaction of [L{(Ar)(Ph$_2$P)N}Si:]} (1.1) and GeCl$_2$, dioxane. Compound 1.3 was isolated alongside the amidinato amidosilylene – germylene adduct, [L{(Ar)(Ph$_2$P)N}Si→GeCl$_2$]} (1.2). A crude $^{29}$Si NMR spectrum of the mother liquor revealed the presence of silaamine [LSi(=NAr)Cl] (1.4) and trichlorosilane derivative (LSiCl$_3$) (1.5). The thermal conversion of 1.1 to its constitutional isomer, together with the isolated products, and detected intermediates hints at a possible mechanism which involves several redox processes. Chapter 2 describes the isolation of a variety of transition metallogermelene complexes by a reaction of base-stabilized germanium(I) dimer [LGe:]$_2$ (2.1, L = 2-imino-5,6-methyleneoxyphenyl) with various transition metal complexes. These reactions represent a rare example of metallogermelene synthesis without the use of harsh transition metallocomplexes in salt metathesis reactions. Chapter 3 describes the simple synthesis of the first germelenylsilylene (3.3) starting from the 2-imino-5,6-methyleneoxyphenylchlorogermylene. Suitable crystals of compound 3.3 for X-ray crystallography could not be isolated due to its inherent instability. Compound 3.3 decomposes into unidentified products within days in solution. However, it is sufficiently stable to be characterized by multinuclear NMR spectroscopy. An in-situ generated 3.3 can undergo a clean reaction with 2 equivalents of 2,6-diisopropylphenylazide at low temperature to form compound 3.4. Compound 3.4 represents a rare example of a silaamidinato germylene. The proposed structure of compound 3.3 can be inferred from the molecular structure of 3.4.

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