Reactivity of Alkoxyethynyl(trimethyl)silane, -germane and -stannane towards Trialkylboranes. Organometallic-Substituted Enol Ethers

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Methoxyethynyl(trimethyl)silane (1\textsubscript{a}) reacts at 100 °C very slowly with triethylborane (4) to give a mixture of alkenes, one of which is the 1,1-organoboration product (Z)-1-methoxy-1-trimethylsilyl-2-diethylboryl-but-1-ene (7\textsubscript{a}). Methoxyethynyl(trimethyl)germane (2\textsubscript{a}) reacts within minutes at 60 – 70 °C with 4, tripropylborane (5) and 9-ethyl-9-borabicyclo[3.3.1]nonane (6) by 1,1-organoboration in the usual regio- and stereospecific way to give the corresponding alkenes (9\textsubscript{a} – 11\textsubscript{a}). The analogous reactions of the ethoxyethynyl(trimethyl)germane (2\textsubscript{b}) require longer heating and are accompanied by decomposition of 2\textsubscript{b}. Ethoxyethynyl(trimethyl)stannane (3\textsubscript{b}) reacts with the trialkylboranes 4 – 6 already below room temperature by 1,1-organoboration to give the alkenes (12\textsubscript{b} – 14\textsubscript{b}) in quantitative yield. The compound 3\textsubscript{b} also reacts with the alkenes, e.g. 9\textsubscript{a}, 13\textsubscript{b}, 14\textsubscript{b}, to give novel organometallic-substituted dienes. All products were characterised by multinuclear magnetic resonance spectroscopy (\textsuperscript{1}H, \textsuperscript{11}B, \textsuperscript{13}C, \textsuperscript{29}Si, and \textsuperscript{119}Sn NMR).

\textbf{Key words:} Silicon, Germanium, Tin, Enol Ethers, Boranes