Germylation of α-Heteroatom-Substituted Alkenes

Vinylgermanes are interesting synthetic building blocks that provide specific features such as low toxicity, facile halodegermylation and excellent stability towards protonolysis. With a reactivity pattern similar to that of vinylsilanes and vinylstannanes, vinylgermanes offer a useful alternative to the more popular group 14 homologues when they meet flaws.

However, there is no direct synthetic method for the preparation of β,β-polysubstituted vinylgermanes. Alkylgermylation, e.g., the L2-addition of germanium–metal bonds across the carbon–carbon triple bond of alkenes, is a conceptually appealing approach for the synthesis of β-metated vinylgermanes that could be used for the synthesis of trifluorotetrafluoroalkylvinylgermanes after in situ functionalization of the (sp3)–Zn bond. We disclosed here the first germylation reaction of C–C triple bonds using a combination of a hydrogermane and dichlorobenzilimine in a radical chain process. This reaction selectively installs a (sp3)–Zn bond and that can be used as a linchpin for subsequent functionalization in a one-pot procedure, offering modular access to tailored vinylgermanes that are not achievable by other methods.

REFERENCES