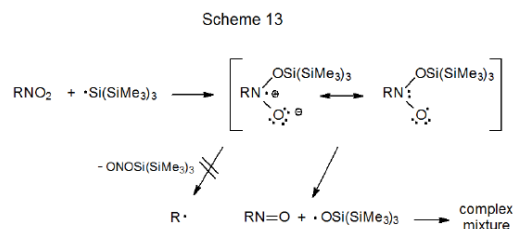
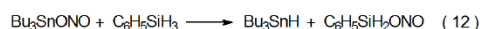
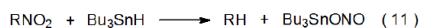


## V. Reactions of Nitro Compounds with Silanes

Concerns with the toxicity of tri-*n*-butyltin hydride and the purification problems that accompany its use have spawned a variety of attempts to replace this reagent with a less troublesome one (see [Appendix I](#)). Tris(trimethylsilyl)silane normally is an attractive alternative to  $\text{Bu}_3\text{SnH}$ , but it fails completely in this role in group replacement reactions in nitro compounds. The reason for failure is that the radical formed by addition of  $(\text{Me}_3\text{Si})_3\text{Si}\cdot$  to a nitro group does not break the carbon–nitrogen bond required for group replacement but rather cleaves a nitrogen–oxygen bond to begin a sequence of reactions leading to a complex reaction mixture (Scheme 13).<sup>48</sup>



A more effective procedure for reducing the amount of tri-*n*-butyltin hydride needed for nitro-group replacement with a hydrogen atom consists of regenerating  $\text{Bu}_3\text{SnH}$  from the  $\text{Bu}_3\text{SnNO}_2$  formed during the substitution process. A pair of reactions that achieve group replacement and regenerate  $\text{Bu}_3\text{SnH}$  are given in equations 11 and 12. This alternative method requires only 10% of the tri-*n*-butyltin hydride needed in the standard procedure.<sup>49</sup>



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