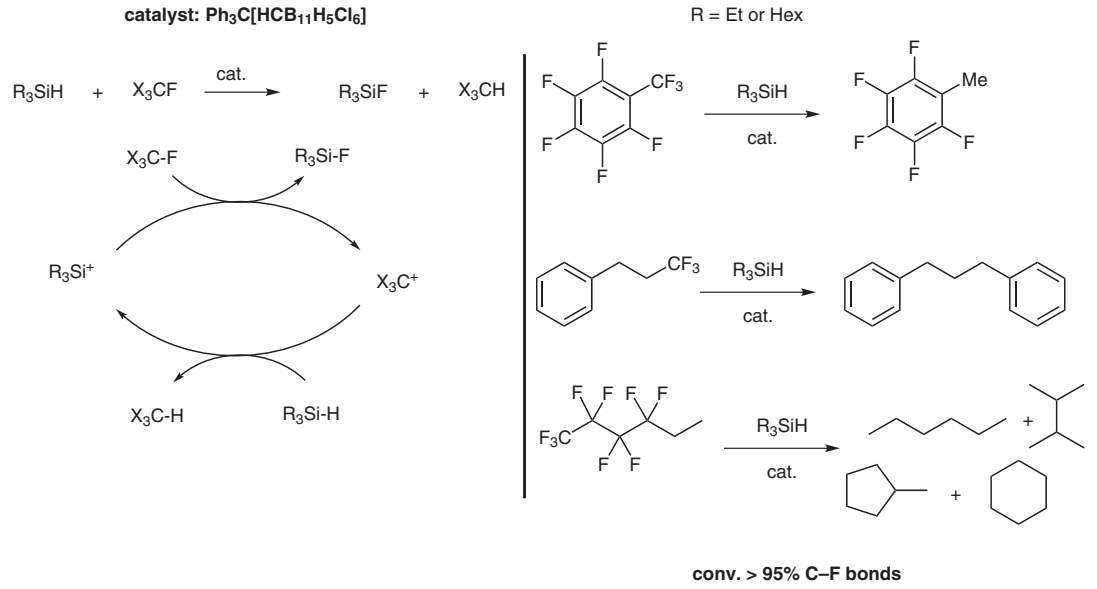
C. DOUVRIS, O. V. OZEROV* (BRANDEIS UNIVERSITY, WALTHAM, USA)
Hydrodefluorination of Perfluoroalkyl Groups Using Silylium-Carborane Catalysts
Science **2008**, *321*, 1188-1190.

Catalytic Hydrodefluorination of Perfluorinated Compounds



Significance: Partially fluorinated hydrocarbons and perfluorinated hydrocarbons are part of the main contributors to the 'super greenhouse gases'. Additionally, perfluorooctanesulfonic acid derivatives that are used in surfactants were shown to be toxic. The transformation of these compounds to the unreactive hydrocarbons could potentially have a huge impact on the environmental effects of these substances. The authors of this paper have provided methods for the derivatization of these partially and perfluorinated compounds to their unfunctionalized counterparts.

Comment: The authors applied the Lewis acid mediated activation of the C–F bond rather than the redox process typically employed. Taking advantage of the enthalpic nature of the Si–F bond and C–H versus the Si–H and C–F bonds, the authors cleverly designed a catalytic system to provide the desired effect. The use of $[B(C_6F_4)_4]^-$ anion as catalyst provided poor reactivity but by using carborane as in this study complete conversion the substrate was achieved. Catalyst loadings as low as 0.036 mol% were employed; however, 0.5 mol% for more difficult substrates such as nonafluorohexane were necessary. Previously, groups have taken advantage of liable C–F bonds such as benzylic or allyl derivatives, but this report provides an example of a completely unfunctionalized perfluorinated compound, albeit at higher catalyst loadings. Additionally, the authors describe out ^{19}F NMR experiments displaying the conversion of C–F to Si–F over time.

SYNFACTS Contributors: Hisashi Yamamoto, Joshua P. Abell
Synfacts 2008, 11, 1171-1171 Published online: 23.10.2008
DOI: 10.1055/s-0028-1083444; **Reg-No.:** H11808SF

Category
Metal-Catalyzed Asymmetric Synthesis and Stereoselective Reactions
Key words
hydrodefluorination
boron
green chemistry