A dense liquid (34.3 g) was obtained. Found (%): Al, 5.57. $C_{30}H_{63}Al$. Calculated (%): Al, 5.98. After this product (22.6 g) in heptane was oxidized by air oxygen, decanol (18.6 g) was obtained, b.p. 108—109 °C (7 Torr), n_D^{20} 1.4352 (*cf.* Ref. 5: b.p. 107—108 °C (7 Torr), n_D^{20} 1.43719).

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Palladium-catalyzed reactions of organoboron compounds with acyl chlorides

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We have shown previously[1—3] that the reaction of organoboron compounds (OBC) with organic halides, which is an important method for the formation of a new C—C bond,[4] occurs readily in an aqueous organic solvent or in water when catalyzed by "ligand-free" palladium[5] in the presence of a base. However, the interactions of OBC with acyl chlorides under similar conditions remain almost unstudied. It has only been reported[6] that the $Pd(Ph_3P)_4$-catalyzed reaction of Ph_4BNa with RCOCl involves only one phenyl group of borate and results in the corresponding ketones RCOPh.

In this work, we have established for the first time that chloroanhydrides of carboxylic acids react with arylboric acids in the presence of "ligand-free" palladium to form the corresponding diaryl ketones in high yields (Scheme 1). It also was found that ketones are formed under similar conditions from chloroanhydrides of carboxylic acids and Ph_4BNa, and all four phenyl groups of OBC participate in the reaction.

Scheme 1

$$ArB(OH)_2 + RCOCl \xrightarrow{a} RCOAr$$

Ar = *o*-MeC_6H_4, *m*-MeC_6H_4, 3-NO_2-4-MeC_6H_3; R = Ph

$$Ph_4BNa + 4\ R'COCl \xrightarrow{a,\ b} 4\ R'COPh$$

R′ = *m*-$NO_2C_6H_4$, (*E*)-PhCH=CH, Ph

Reagents and conditions: *a*. 1 mol.% $PdCl_2$, Na_2CO_3, acetone, water, 20 °C; *b*. 1 mol.% $Pd(OAc)_2$, Na_2CO_3, acetone, 20 °C.

The $PdCl_2$-catalyzed reaction of benzoyl chloride with $ArB(OH)_2$ or Ph_4BNa in the presence of Na_2CO_3 in aqueous acetone is completed in 1 h at room temperature. Easily hydrolyzed acyl chlorides (*m*-nitrobenzoyl chloride and cinnamoyl chloride) react smoothly with OBC catalyzed by $Pd(OAc)_2$ in anhydrous acetone in the presence of Na_2CO_3.

***m*-Methylbenzophenone.** *m*-Tolylboric acid (0.697 g, 0.5 mmol) was dissolved in a mixture of acetone (2 mL) and an aqueous 1.63 *M* solution of Na_2CO_3 (1 mL) in an atmosphere of argon, and PhCOCl (0.06 mL, 0.5 mmol) and an aqueous 0.1 *M* solution of $PdCl_2$ (0.05 mL, 0.005 mmol) were added. After stirring at 20 °C for 15 min, Pd black precipitated from the reaction mixture. Then an aqueous 0.1 *M* solution of $PdCl_2$ (0.05 mL, 0.005 mmol) was added, and the mixture was stirred for 30 min. The reaction mixture was diluted with water (10 mL), saturated with NaCl, and extracted with ether (5×5 mL). The ether extract was dried by $MgSO_4$. After evaporation of the ether, *m*-methylbenzophenone (0.0804 g, 82%) was obtained, m.p. 220—222 °C (*cf.* Ref. 7: m.p. 221—222 °C).

3-Nitro-4-methylbenzophenone (yield 96%), *o*-methylbenzophenone (80%), and benzophenone (96%) were obtained similarly from $Ar(OH)_2$ or Ph_4BNa and PhCOCl.

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***m*-Nitrobenzophenone.** $Pd(OAc)_2$ (0.0022 g, 0.01 mmol, 1 mol.% Pd) was added in an atmosphere of argon to a mixture of Ph_4BNa (0.0922 g, 0.25 mmol), Na_2CO_3 (0.159 g, 1.5 mmol), and m-$NO_2C_6H_4COCl$ (0.1858 g, 1 mmol) in dry acetone (9 mL), and the mixture was stirred at 20 °C for 2.5 h. Then acetone was evaporated on a rotary evaporator, and the residue was diluted with water (10 mL), extracted with chloroform (3×5 mL), and dried with $MgSO_4$. After chloroform was removed on a rotary evaporator, *m*-nitrobenzophenone (0.149 g, 66%) was obtained, m.p. 96—97 C (*cf.* Ref. 8: m.p. 95 °C).

Chalcone was obtained similarly from Ph_4BNa and cinnamoyl chloride (yield 96%).

Thus, the catalytic reactions found occur under very mild conditions and can be used as a new efficient method for the synthesis of nonsymmetric ketones.

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1-(1-Trimethylsilylcyclopropyl)germatrane as the first representative of cyclopropylgermatranes

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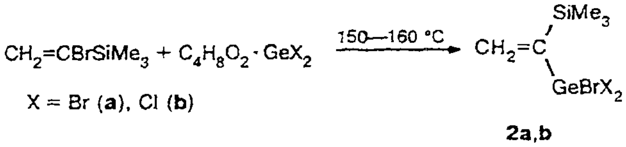
Virtually all germatranes exhibit physiological activities that largely depend on the substituents present in their molecules.[1] Therefore, it seemed of interest to prepare a germatrane molecule containing a cyclopropane fragment, whose presence accounts for the activity of some compounds, in particular, pyrethroids.[2]

In this study, we synthesized the first representative of cyclopropylgermatranes, *viz.*, 1-(1-trimethylsilylcyclopropyl)germatrane (**1**). As the first step, we prepared 1-tribromogermyl-1-trimethylsilylethylene[3] (**2a**) (yield 75%) and 1-bromodichlorogermyl-1-trimethylsilylethylene (**2b**) (yield 82%) by the reactions of 1-bromovinyltrimethylsilane with the dioxane complexes of dichloro- and dibromogermylene, respectively.[4]



$$\mathrm{CH_2{=}CBrSiMe_3 + C_4H_8O_2\cdot GeX_2 \xrightarrow{150-160\ ^\circ C} CH_2{=}C(SiMe_3)(GeBrX_2)}$$

X = Br (**a**), Cl (**b**)

2a,b

Subsequently 1-(trimethylsilyl)vinyltrihalogermanes **2** were converted into 1-trimethylsilyl-1-trimethoxygermylethylene (**3**) by treating them with methanol.

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