

## Preliminary communication

### Carbon-functional organosilicon compounds containing an $\alpha$ -hetero substituent

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The synthesis of halomethylsilanes,  $R_3SiCHX_2$ , via halomethyl metal compounds has been developed by Seyferth *et al.*<sup>1</sup>. Recently it was reported that  $Ph_3SiCH(Ph)OMe$  is formed when  $Ph_3Si \cdot C(OMe)_2Ph$  and  $Ph_3SiH$  are heated together at  $190^\circ$  and the intermediacy of  $(Ph \cdot \overset{||}{C} \cdot OMe)$  in this and other reactions was established<sup>2</sup>. A more general approach to the synthesis of compounds of the type  $R_3Si \cdot CH(R)Y$  ( $R = \text{alkyl, aryl; } Y = OR, NR_2 \text{ etc.}$ ) is desirable in view of current interest in the electronic effects of  $\alpha$ -metallo-alkyl groups<sup>3</sup> and their thermolysis<sup>4</sup>.

We report that heterocarbeneoid compounds of the transition metals provide a suitable source of carbene fragments for insertion into Si-H bonds, and describe the synthesis of some  $\alpha$ -alkoxy- and  $\alpha$ -cycloalkylamino-benzylsilanes. The addition of  $(Ph \cdot \overset{||}{C} \cdot OMe)$  from a similar source to the double bond of *trans*-methyl crotonate has been reported<sup>5</sup>.

In a typical reaction triethylsilane (4.5 mmole), pyridine (6.7 mmole) and the compound  $(CO)_5Cr \cdot C(Ph)NC_4H_9$  (3.2 mmole)<sup>6</sup> are heated in refluxing hexane under argon. The progress of the reaction is indicated by the steady precipitation of the complex  $py_3Cr(CO)_3$  and the evolution of carbon monoxide. After 24 hours the liquid phase contained unreacted starting materials and the compound  $Et_3Si \cdot CH(Ph)NC_4H_9$  (1.3 mmole, 59% yield of pure material based on heterocarbeneoid complex consumed (2.2 mmole); b.p.  $90^\circ/0.1 \text{ mm}$ ). Gas chromatography and elemental analysis established the purity of the reaction product. The NMR spectrum of the material in  $CCl_4$  solution (internal TMS; 60 MHz) shows the following  $\delta$ -values (ppm): 0.62, 15H,  $Et_3Si$ ; 1.70, 4H,  $\beta$ - $CH_2$ ; 2.50, 4H,  $\alpha$ - $CH_2$ ; 2.94, 1H, CH; 7.23, 5H,  $C_6H_5$ . The mass spectrum (70 eV) shows the molecular ion,  $M^+$  ( $m/e$  275) with relative abundance 1% and  $(M-Et)^+$  2%, while the most abundant ion, at  $m/e$  160, corresponds to  $PhCHNC_4H_9^+$ .

By using similar procedures we have isolated other compounds of this type of which the following are examples (yield, %;  $\delta(CH)$  ppm in  $CCl_4$  solution):  $Et_3Si \cdot CH(Ph)NC_2H_4$  (41; 2.07),  $Et_3Si \cdot CH(Ph)OMe$  (82; 3.96),  $Ph_3SiCH(Ph)OMe$  (40; 4.64). The last mentioned compound has physical characteristics identical to those reported earlier<sup>2</sup>. The absence both of heterocarbene dimers<sup>7</sup>,  $[Ph \cdot \overset{||}{C} \cdot Y]_2$  ( $Y = OR, NR_2$ ), and of hydrogenated materials<sup>8</sup> of the type  $Ph \cdot CH_2 \cdot Y$  from among the major products of

these reactions, together with the moderate to good yields of insertion product, provide an index of the specificity of the insertion process under these conditions. A full report of work currently in progress on the synthesis and reactivity of compounds of this type will be made shortly.

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