Synthesis of 3-Silylacrylates by $Co_2(CO)_8$-catalysed Reaction of Methyl Acrylate with Hydrosilanes

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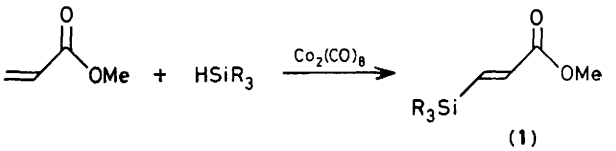
The reaction of an excess of methyl acrylate with hydrosilanes using $Co_2(CO)_8$ as a catalyst gives methyl (*E*)-3-silylacrylates in high yields.

Although it is well known that $Co_2(CO)_8$ is an effective catalyst for the hydrosilylation of alkenes to produce alkylsilanes, similar reactions of acrylates have not been reported so far.[1] We report here the $Co_2(CO)_8$-catalysed reaction of methyl acrylate with hydrosilanes. The reaction of an excess of methyl acrylate with hydrosilanes using $Co_2(CO)_8$ as a catalyst almost selectively gave the methyl (*E*)-3-silylacrylates (**1**) in high yields instead of the corresponding alkylsilanes.

Typically, a solution of methyl acrylate (50 mmol), $HSiEt_2Me$ (10 mmol), and $Co_2(CO)_8$ (0.4 mmol) in benzene (10 ml) was stirred at 25 °C for 3 h. G.l.c. analysis showed that the reaction mixture contained (**1a**) in 86% yield, along with only a small amount of the alkylsilane.† Attempts to apply the reaction to methyl methacrylate and methyl crotonate have so far failed. $HSiMe_3$ and $HSiMe_2Ph$ similarly reacted smoothly to give (**1b**) and (**1c**) in 65 and 69% yields, respectively.

Recently, several metal complexes have been shown to catalyse the reaction of alkenes with hydrosilanes to produce vinylsilanes.[2] However, the catalysed reaction of acrylates with hydrosilanes usually gives the corresponding alkylsilanes.[3]

The present reaction offers a synthetically useful method for the preparation of (*E*)-3-silylacrylates (**1**) which have been prepared previously by a low-yielding reaction sequence starting from prop-2-yn-1-ol.[4]



(**1**)

	% Yield of (**1**)
a; $HSiR_3 = HSiEt_2Me$	86
b; $HSiR_3 = HSiMe_3$	65
c; $HSiR_3 = HSiMe_2Ph$	69

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References

1 G. K. Magomedov, K. A. Andrianov, O. V. Shkolnik, B. A. Izmailov, and V. N. Kalinin, *J. Organomet. Chem.*, 1978, **149**, 29; J. F. Harrod and A. J. Chalk, in 'Organic Syntheses via Metal Carbonyls,' eds. I. Wender and P. Pino, Wiley-Interscience, New York, 1977, Vol. 2, p. 673.
2 Y. Seki, K. Takeshita, K. Kawamoto, S. Murai, and N. Sonoda, *Angew. Chem., Int. Ed. Engl.*, 1980, **19**, 928; R. G. Austin, R. S. Paonessa, P. J. Giordano, and M. S. Wrighton, *Adv. Chem. Ser.*, 1978, **168**, 189; M. A. Schroeder and M. S. Wrighton, *J. Organomet. Chem.*, 1977, **128**, 345; A. Millan, E. Towns, and P. M. Maitlis, *J. Chem. Soc., Chem. Commun.*, 1981, 673.
3 I. Ojima and M. Kumagai, *J. Organomet. Chem.*, 1976, **111**, 43.
4 M. J. Carter, I. Fleming, and A. Percival, *J. Chem. Soc., Perkin Trans.* 1, 1981, 2415; R. F. Cunico and H. M. Lee, *J. Am. Chem. Soc.*, 1977, **99**, 7613.

† The vinylsilane (**1a**) was identified by its i.r. (ν_{max} 1730 and 1600 cm^{-1}), ^1H n.m.r. [(CCl_4) δ 6.15 (d, *J* 19 Hz, 1H) and 7.11 (d, *J* 19 Hz, 1H)], and mass spectra ($M^+ - Et$, *m/z* 157), and gave satisfactory elemental analyses. Satisfactory i.r., ^1H n.m.r., and mass spectra, and elemental analyses were also obtained for (**1b**) and (**1c**).