Cleavage of α-(Phenylthio)alkylboron Compounds to Monothioacetals and Acetals

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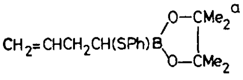
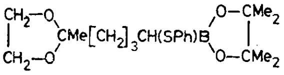
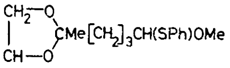
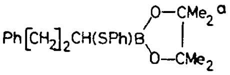
Summary α-(Phenylthio)alkylboron compounds are efficiently and selectively cleaved by *N*-chlorosuccinimide in basic methanol to yield monothioacetals or acetals.

PINACOL α(PHENYLTHIO)ALKANEBORONATES[1] and dialkyl-[α-(phenylthio)alkyl]boranes[2] are readily deboronated to monothioacetals by *N*-chlorosuccinimide (NCS) in mildly basic methanol, conditions reported previously for cleavage of α-methylthio-carboxylic salts to acetals.[3] In the general procedure, treatment of the α-(phenylthio)alkylboron compound (10 mmol) and triethylamine (20 mmol) in methanol (40–50 ml) with NCS (12 mmol) yielded the monothioacetal within 2—20 h at 25 °C. With 22 mmol of NCS, acetals resulted. For purification, products were dissolved in light petroleum and washed with aqueous base, then distilled. Typical results are shown in the Table.

This deboronation method is novel in that it converts organoboranes directly into protected aldehydes under mild basic conditions. It is compatible with an alkene or acetal function elsewhere in the molecule. Only sulphur-substituted organoboranes react, as shown by the specificity of cleavage of trialkylboranes, as well as by the failure of attempted cleavage of 1,1-bis(ethylenedioxyboryl)-2-phenylethane, $PhCH_2CH(BO_2C_2H_4)_2$,[4] which was 75% recovered after 18 h. Thus, initial attack of *N*-chlorosuccinimide appears to be at sulphur.

TABLE. Conversion of α-(phenylthio)alkylboranes into monothioacetals and acetals.

Borane	Product [a]	% Yield
	$CH_2{=}CHCH_2CH(SPh)OMe$	65
$Me[CH_2]_3CH(SPh)BBu^n_2$	$Me[CH_2]_3CH(SPh)OMe$	71[b]
		68
	$Ph[CH_2]_2CH(OMe)_2$ [c]	79

[a] New compounds gave satisfactory analyses and ^1H n.m.r. spectra. [b] From Bu^n_3B. [c] E. J. Corey and B. W. Erickson, *J. Org. Chem.*, 1971, **36**, 3553.

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