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Table 5. Reaction of iodobenzene in tri-*n*-butyltin deuteride / tri-*n*-butyltin hydride mixtures at 31 °C. An attempted direct determination of the deuterium kinetic isotope effect.^a

Reactants (moles)					
10 ⁵ x IPh	10 ⁴ x <i>n</i> -Bu ₃ SnH ^b	10 ⁴ x <i>n</i> -Bu ₃ SnD ^c	C ₆ H ₆ / C ₆ H ₅ D ^d	SnH / SnD	k _H / k _D ^e
1.62	3.38	2.23	1.46	1.52	0.964
1.77	2.38	2.51	0.925	0.948	0.976
1.81	1.80	3.14	0.571	0.573	0.997

^aExperiments are listed in the order in which they were carried out. Iodobenzene in mixtures of (neat) *n*-Bu₃SnH and (neat) *n*-Bu₃SD (ca. 1 : 10 : 10 mole ratio) was photolyzed ($\lambda > 300$ nm) for 4 min after which the mixtures were analyzed in the usual way for C₆H₆ and C₆H₅D. Corrections were required for the purity of the *n*-Bu₃SnH (97%) and *n*-Bu₃SnD (96%) and for the probable 2.8% *n*-Bu₃SnH impurity in the *n*-Bu₃SnD:

$$(n\text{-Bu}_3\text{SnH})_{\text{actual}} = 0.97 (n\text{-Bu}_3\text{SnH})_{\text{nominal}} + (0.028 \times 0.96) (n\text{-Bu}_3\text{SnD})_{\text{nominal}}$$

$$(n\text{-Bu}_3\text{SnD})_{\text{actual}} = (0.960 \times 0.972) (n\text{-Bu}_3\text{SnD})_{\text{nominal}}$$

$$\frac{k_H}{k_D} = \frac{(C_6H_6)_{\text{actual}}}{(C_6H_5D)_{\text{actual}}} \cdot \frac{0.933 (n\text{-Bu}_3\text{SnD})_{\text{nominal}}}{0.97 (n\text{-Bu}_3\text{SnH})_{\text{nominal}} + 0.027 (n\text{-Bu}_3\text{SnD})_{\text{nominal}}}$$

^b(*n*-Bu₃SnH)_{actual}. ^c(*n*-Bu₃SnD)_{actual}. ^dThis ratio was calculated from the ion intensities of *m/z* = 78 and 79 and solution of the two simultaneous equations as detailed in the experimental section. ^ek_H / k_D = (C₆H₆ / C₆H₅D) / (SnH / SnD).