

$^{29}\text{Si-H}$ Spin Coupling Constants

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WE are at present engaged in a study of spin couplings in Si-H fragments. Data have been collected on 62 compounds, of which 31 have already appeared in the literature. We have noticed that an empirical equation of the type used by Malinowski¹ to correlate $^{13}\text{C-H}$ couplings is applicable to $^{29}\text{Si-H}$ couplings. The coupling constant for the compound SiHXYZ can be written

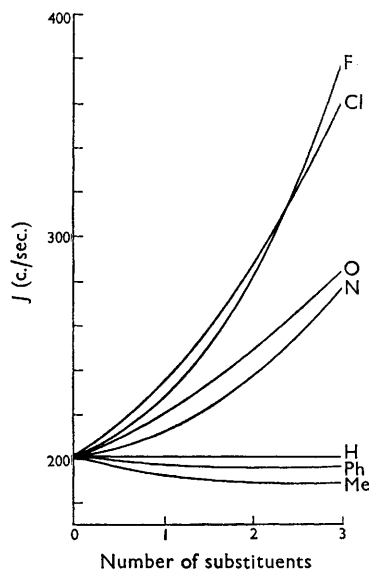
$$J_{X,Y,Z} = J'_{XY} + J'_{YZ} + J'_{ZX}$$

where the J' are constants for each pair of substituents. The equation has been tested over a range of compounds in which X, Y, and Z are all possible combinations of hydrogen, methyl, phenyl, and chlorine. The following parameters were obtained (in c./sec.)

$$\begin{aligned} J'_{\text{HH}} &= 67.6 \\ J'_{\text{HCl}} &= 84.7 \quad J'_{\text{HMe}} = 63.5 \quad J'_{\text{HPh}} = 66.0 \\ J'_{\text{ClCl}} &= 120.5 \quad J'_{\text{ClMe}} = 79.9 \quad J'_{\text{ClPh}} = 84.6 \\ J'_{\text{MeMe}} &= 63.1 \quad J'_{\text{MePh}} = 63.4 \\ J'_{\text{PhPh}} &= 66.1 \end{aligned}$$

We have also extended previously recorded data to enable us to draw a Figure which shows the

variation in $J(^{29}\text{Si-H})$ as 1, 2, or 3 substituents are introduced into SiH_4 .



FIGURE

Variation in $J(^{29}\text{Si-H})$ as substituents are introduced into SiH_4 .

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¹ E. R. Malinowski and T. Vladimiroff, *J. Amer. Chem. Soc.*, 1964, **86**, 3375.