

# The Substituent Effect on the Ultraviolet Spectrum of 1,2-Diphenyltetramethyldisilane<sup>1)</sup>

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It has previously been reported from this laboratory<sup>2)</sup> that polysilanes with phenyl or vinyl groups, unlike monosilanes, have a very intense absorption in the ultraviolet region. This interesting ultraviolet property of polysilanes has been studied by several groups of workers in recent years.<sup>3-5)</sup> These investigations are in accord with the view that the silicon-silicon bond is essential as a chromophore in making an enhanced conjugation with pi-electron systems.

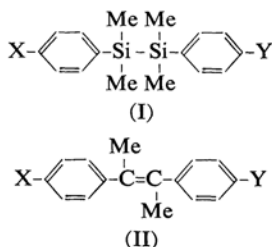


TABLE I. UV SPECTRA OF SOME 1,2-DIPHENYL-TETRAMETHYLDISILANES<sup>a)</sup>

Substituent		$\lambda_{\max}$ m $\mu$	$\epsilon \times 10^{-4}$
X	Y		
none		238.0	1.85
<i>p</i> -CH <sub>3</sub>	<i>p</i> -H	238.5	2.11
<i>p</i> -CH <sub>3</sub>	<i>p</i> -CH <sub>3</sub>	239.0	2.49
<i>p</i> -CH <sub>3</sub> O	<i>p</i> -CH <sub>3</sub> O	242.0	3.26
<i>p</i> -CH <sub>3</sub> O	<i>p</i> -H	241.0	2.58
<i>p</i> -CH <sub>3</sub> O	<i>p</i> -CH <sub>3</sub>	241.5	2.82
<i>p</i> -Cl	<i>p</i> -Cl	242.5	2.80
<i>p</i> -CH <sub>3</sub>	<i>p</i> -Cl	240.5	2.46

a) Spectra were obtained in *n*-hexane with Shimadzu SV-50A automatic recording spectrophotometer.

We have now prepared several derivatives of 1,2-diphenyltetramethyldisilane (I)<sup>6)</sup> and examined their ultraviolet absorption spectra (Table I).

Bathochromic shifts of the first intense band of the parent compound are observed with all the available *para*-substituted derivatives; apparently the bathochromic effects of substituents are additive.

It is of considerable interest to compare the ultraviolet spectra of these compounds with those of the correspondingly-substituted *trans*- $\alpha$ ,  $\alpha'$ -dimethylstilbenes (II).<sup>7)</sup> As may be seen in Fig. 1, there is a linear correlation between

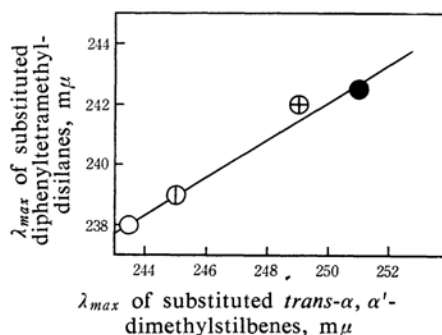


Fig. 1. Correlation of  $\lambda_{\max}$  of diphenyltetramethyldisilanes with  $\lambda_{\max}$  of *trans*- $\alpha$ ,  $\alpha'$ -dimethylstilbenes

- Unsubstituted
- ⊙ *p*, *p'*-Dimethyl
- ⊕ *p*, *p'*-Dimethoxy
- *p*, *p'*-Dichloro

the absorption maxima of the disilanes (I) and those of the stilbenes (II).

Further details will be published later.

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1) Presented in part at the 18th Annual Meeting of the Chemical Society of Japan, Osaka, April, 1965.

2) H. Sakurai and M. Kumada, This Bulletin, 37, 1894 (1964).

3) D. N. Hague and R. H. Prince, *Proc. Chem. Soc.*, 1962, 300.

4) H. Gilman, W. H. Atwell and G. L. Schwabke, *Chem. & Ind.*, 1964, 1063.

5) H. Gilman, W. H. Atwell and G. L. Schwabke, *J. Organometal. Chem.*, 2, 369 (1964).

6) Details of preparations will be published elsewhere.

7) Y. Nagai, *J. Soc. Org. Synth. Chem. Japan*, 19, 464 (1961).