details of the analysis of the absorption spectra of ferrocene and other sandwich complexes as well as a discussion of the relationship of the results to the bonding in these compounds will be published in the near future.

Department of Chemistry, University of Houston,
Houston 4, Texas (U.S.A.)

Donald R. Scott
Ralph S. Becker

1 F. A. Cotton, ed., *Progress in Inorganic Chemistry*, Vol. I, Interscience, New York, 1959.
2 D. R. Scott and R. S. Becker, *J. Chem. Phys.*, 35 (1961) 516, 2246.
3 E. M. Shustorovich and M. E. Dyatkina, *Dokl. Akad. Nauk SSSR*, 128 (1959) 1234; *Zh. Strukt. Khim.*, 1 (1960) 109.
4 J. P. Dahl and C. J. Ballhausen, *Kgl. Danske Videnskab. Selskab, Mat.-Fys. Medd.*, 33 (1961) 5.
5 L. L. Lohr, Ph.D. Dissertation, Harvard University, 1963.
6 R. D. Fischer, *Theoret. Chim. Acta*, 1 (1963) 418.
7 A. D. Liehr and C. J. Ballhausen, *Acta Chem. Scand.*, 11 (1957) 207.
8 T. S. Piper and R. L. Carlin, *J. Chem. Phys.*, 33 (1960) 1208.
9 F. J. Smith, J. K. Smith and S. P. McGlynn, *Rev. Sci. Instr.*, 12 (1962) 1367.
10 D. A. Levy, Ph.D. Dissertation, Cambridge University, 1960.
11 D. R. Scott and R. S. Becker, unpublished studies.
12 F. A. Matsen, *J. Am. Chem. Soc.*, 81 (1959) 2023.
13 J. S. Griffith, *The Theory of Transition-Metal Ions*, Cambridge Univ. Press, Cambridge, 1961, p. 437.
14 R. L. Collins, *J. Chem. Phys.*, 42 (1965) 1072.

Received May 17th, 1965

J. Organometal. Chem., 4 (1965) 409–411

The catalytic alkaline cleavage of partially substituted methylsiloxanes

Several cleavage reactions of partially substituted organosiloxanes (I) are known[1–3]. All are characterised by strict stoichiometry between the reactants.

$R_mH_{(3-m)}SiOSiR_nH_{(3-n)}$ (I)
R = lower aliphatic or aromatic hydrocarbon radicals, identical or different
m, n = 1, 2 or 3, identical or different

We have now observed alkali-catalysed cleavage with hydrogen migration between silicon atoms of some siloxanes of type (I) with R = Me. The reaction produces silanes with increased H/Si ratio and siloxanes with increased O/Si ratio. The reactions were carried out under dry argon or nitrogen in dry ether or tetrahydrofuran containing 5 % starting material and 1–100 parts per million of sodium. Examples of starting materials and products are listed in Table 1.

All products were identified by infrared spectroscopy[4], supplemented by gas-liquid chromatography for the gaseous silane mixtures. Nuclear magnetic resonance spectroscopy was used to check the purity of the starting materials. Sodium was determined by flame photometry in the residue after evaporation of 500 ml solvent containing concentrated hydrochloric acid.

Tetrahydrofuran dissolves up to 0.5 parts per million of sodium out of glass, enough to catalyse the cleavage reactions. No reaction was found in quartz apparatus with solvents containing less than 0.01 part per million of sodium.

The same cleavage also occurs in hydrocarbons above 100° in the presence of sodium metal if the solution contains about 50 parts per million water or lower alcohol, but there is no reaction if this quantity is less than 10 parts per million.

J. Organometal. Chem., 4 (1965) 411–412

TABLE 1

CATALYTIC SODIUM CLEAVAGE OF METHYL-HYDRO-SILOXANES IN THF
$R = CH_3$.

Starting materials	*Products*		*Reaction temperature*	*Approx. time (hours) for 50% conversion*
	Silanes	*Siloxanes*		
$HR_2SiOSiR_3$	H_2R_2Si HR_3Si	$R_3SiO(SiR_2O)_nSiR_3$ $n = 1$ or 2	60°	1
$(HR_2Si)_2O$	H_2R_2Si	$(R_2SiO)_4$	60°	1
$(R_3SiO)_2SiHR$	H_3RSi H_2R_2Si HR_3Si	$(R_3SiO)_3SiR$ $[(R_3SiO)_2RSi]_2O$	60°	1
$(R_2HSiO)_2SiHR$	H_3RSi H_2R_2Si	$(RSiO_{1.5})_x$	−10°	0.1
$(RHSiO)_4$	H_3RSi	$(RSiO_{1.5})_x$	−10°	0.1

The reaction described here differs from previously reported cleavage reactions in that only catalytic amounts of alkali are used, and thus silanols or silanolates are absent from the products.

Imperial Chemical Industries Ltd., Plastics Division, Research Department, Welwyn Garden City, Hertfordshire (Great Britain)
E. L. ZICHY

[1] M. C. HARVEY, W. H. NEBERGALL AND J. S. PEAKE, *J. Am. Chem. Soc.*, 79 (1957) 1437.
[2] J. C. B. SMITH, *Analyst*, 85 (1960) 465.
[3] C. EABORN, *Organosilicon Compounds*, Butterworth, 1960, p. 286.
[4] N. WRIGHT AND M. J. HUNTER, *J. Am. Chem. Soc.*, 69 (1947) 803; H. KRIEGSMANN, *Z. Elektrochemie*, 65 (1961) 336.

Received July 23rd, 1965

J. Organometal. Chem., 4 (1965) 411–412

Innere Elektronenanregungen von Tricyclopentadienyl-Komplexen des Ytterbiums

Von den zahlreichen in letzter Zeit beschriebenen Lanthaniden–cyclopentadienyl-Komplexen[1] beanspruchen die Verbindungen des verhältnismässig einfachen Chromophors Yb(III) mit der Elektronenkonfiguration $[Xe]4f^{13}$ besonderes Interesse. Wir berichten hier über die Absorptionsspektren von Lösungen der Verbindungen des Typs Cp_3YbX ($Cp = \pi\text{-}C_5H_5$; X = basischer Neutralligand) bei Raumtemperatur im Bereich von 9.00 bis 19.00 kK.

Sämtliche Spektren (vgl. Tabelle), einschliesslich dem des Grundkörpers Cp_3Yb, zerfallen offensichtlich stets in vier engere Bandengruppen I–IV. Die Absorptionen der Gruppen I–III ordnen wir auf Grund ihrer Frequenzen[2], Intensitäten und durchschnittlichen Halbwertsbreiten ($\Delta\nu_{1/2} \approx 100$ K) f–f-Übergängen innerhalb der Konfiguration $4f^{13}$ zu. Im hier betrachteten Frequenzbereich sollten die Übergänge von den niedrigsten Stark-Komponenten des Terms $^2F_{7/2}$ nach den drei Kramers-Dubletts liegen, die durch Ligandenfeld(LF)-Aufspaltung aus dem Term $^2F_{5/2}$ entstehen. Zugleich dürften auch einige Schwingungsanregungen auftreten. Die jeweils intensivsten Banden der drei ersten Gruppen (I,2, II,3 und III,1) gehören wahrscheinlich zu den

J. Organometal. Chem., 4 (1965) 412–414