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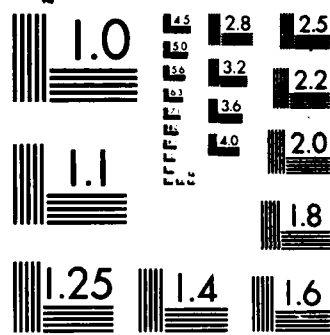
CHEMISTRY OF NEW SILICON CONTAINING POLYMERS TRIPLY
BONDED SILICON INTERM (U) UNIVERSITY OF SOUTHERN
CALIFORNIA LOS ANGELES DEPT OF CHEMIST W P WEBER
DEC 85 AFOSR-TR-86-0131 AFOSR-82-0333 F/G 7/3

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REPORT DOCUMENTATION PAGE **AD-A166-085** (2)

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release Distribution unlimited		
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S)			5. MONITORING ORGANIZATION REPORT NUMBER(S) AFOSR-TR- 86-0131		
5a. NAME OF PERFORMING ORGANIZATION Department of Chemistry University of So. California		6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION AFOSR/NC		
5c. ADDRESS (City, State, and ZIP Code) University Park Los Angeles, CA 90089-1661			7b. ADDRESS (City, State, and ZIP Code) Bldg 410 Bolling AFB DC 20332-6448		
a. NAME OF FUNDING / SPONSORING ORGANIZATION AFOSR		8b. OFFICE SYMBOL (If applicable) NC	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER AFOSR-82-0333		
8c. ADDRESS (City, State, and ZIP Code) Bldg 410 Bolling AFB, DC 20332-6448			10. SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO. 61102F	PROJECT NO. 2303	TASK NO. B2
				WORK UNIT ACCESSION NO.	
11. TITLE (Include Security Classification) Chemistry of New Silicon Containing Polymers Triply Bonded Silicon Intermediates					
12. PERSONAL AUTHOR(S) William P. Weber					
13a. TYPE OF REPORT Final		13b. TIME COVERED FROM 31 Aug 82 TO 31 Oct 85		14. DATE OF REPORT (Year, Month, Day) Dec 85	
				15. PAGE COUNT 10	
16. SUPPLEMENTARY NOTATION					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP			
			Silanes, Photolysis, Silanones		
19. ABSTRACT (Continue on reverse if necessary and identify by block number)					
→ A method to generate [O=S1=O] in the gas phase by flash vacuum pyrolysis (FVP) of 2,3:4,7 diepoxy 5-silaspiro [4.4] nonane was developed. Reactive pi-bonded silicon nitrogen double bonds intermediates were generated by FVP of dimethoxymethylsilyl-bis (trimethylsilyl) amine. Photolysis of dodecamethylcyclohexasilane yields both dimethylsilylene and methylsilene. The oxidation of dimethylsilylene with sulfoxides yields silanones. <i>over</i>					
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT ☐ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION		
22a. NAME OF RESPONSIBLE INDIVIDUAL A.J. Matuszko			22b. TELEPHONE (Include Area Code) 767-4963		22c. OFFICE SYMBOL NC

FILE COPY

→ Sterically hindered t-butyldimethyl-silaned permits control in the silyl
hydroformylation reaction, FINAL REPORT: Chemistry of New Silicon Containing
Polymers Triply Bonded Silicon Intermediates, AFOSR-82-0333.

✓ Keywords: Silanes, Silanols

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JAN 27 1986

AFOSR-TR- 86 - 0131

PROGRESS REPORT #6 / FINAL REPORT

Period Covered: 31 August 1982 to 31 October 1985

Grant Number: AFOSR 82-0333

**Title: Chemistry of New Silicon Containing Polymers
Triply Bonded Silicon Intermediates**

Principal Investigator: William P. Weber

Loker Hydrocarbon Research Institute

Department of Chemistry

University of Southern California

University Park

Los Angeles, California 90089-1661

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COMPLETED PROJECT SUMMARY

1. TITLE: Chemistry of New Silicon Containing Polymers Triply Bonded
Silicon Intermediates
2. PRINCIPAL INVESTIGATOR: Professor William P. Weber
3. INCLUSIVE DATES: August 31, 1982 to October 31, 1985
4. GRANT NUMBER: AFOSR 82-0333
5. COSTS AND FY SOURCE:

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MATTHEW J. KEMPER
Chief, Technical Information Division

6. SENIOR RESEARCH PERSONNEL:

Professor W. P. Weber, principal investigator worked on this contract ten percent of his time during the academic years 8-31-1982 to 10-31-1985 and one hundred percent of his time for two months each Summer 1983, 1984, and 1985.

Professor K. L. Servis worked one month during the Summer 1984 as a consultant on ^{29}Si NMR.

Professor Kyung Tae Kang, on sabbatical leave from the Department of Chemistry of Pusan University, Pusan, South Korea, has worked on this contract 1-15-1985 to 10-31-1985.

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Dr. Y. M. Pai, 2-1-1985 to 10-31-1985. Dr. Pai received his Ph.D. from USC under my supervision.

Dr. E. Wanek, 3-3-1983 to 6-30-1984. Dr. Wanek is a graduate of the Technical University, Graz, Austria.

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Y. M. Pai, 8-31-1982 to 8-31-1983, and 6-1-1984 to 12-

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S. Hedayati, 6-1-1983 to 8-31-1983.

E. Marslett, 6-1-1984 to 8-31-1984.

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UNDERGRADUATE RESEARCH ASSISTANTS:

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C. Smith, 5-31-1984 to 6-27-1984

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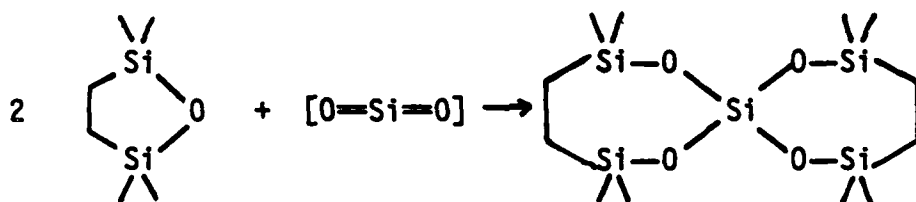
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 12. Silicon-29 NMR Studies of Polymethylhydrosiloxanes: T_1 Measurements, Yi-Ming Pai, William P. Weber and Kenneth L. Servis, J. Organometal. Chem., **288**, 269 (1985).
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Invited Lecture, 2nd International Symposium on Ultrastructure Processing of Ceramics, Glasses and Composites, February 25-March 1, 1985.

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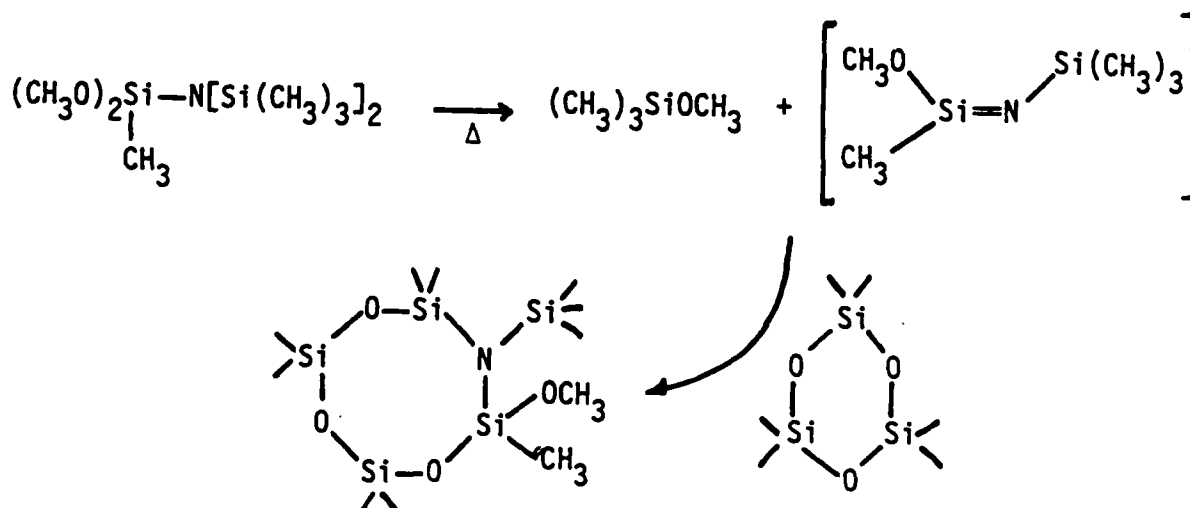
9. ABSTRACT OF OBJECTIVES AND ACCOMPLISHMENTS:

A method to generate $[O=Si=O]$ in the gas phase by flash vacuum pyrolysis of 2,3:4,7 diepoxy 5-silaspiro [4.4] nonane (I) has been developed. Co-pyrolysis of I and cyclic siloxanes permits the facile synthesis of spirosiloxanes.



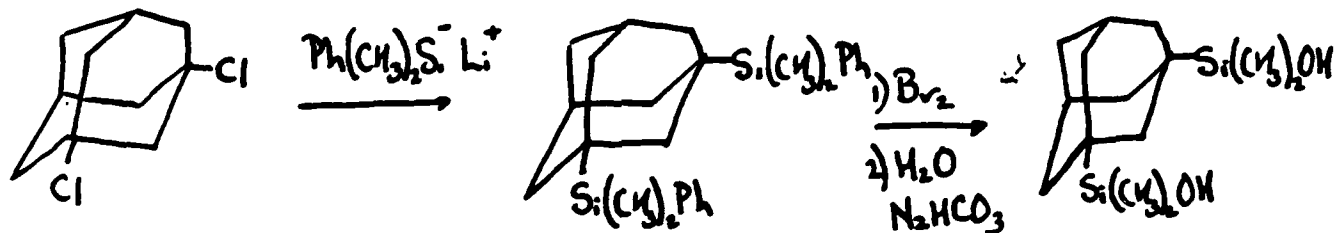
FVP of I alone yields a high surface area ($300 \text{ M}^2/\text{g}$) silica which has been further characterized by scanning and transmission electron microscopy. See publications 8, 11, 16 and 21

Reactive π -bonded silicon nitrogen double bonds intermediates have been generated by FVP of dimethoxymethylsilyl-bis(trimethylsilyl)amine. These intermediates have been reacted with silicon-oxygen single bonds of cyclic siloxanes to yield new heterocycles.



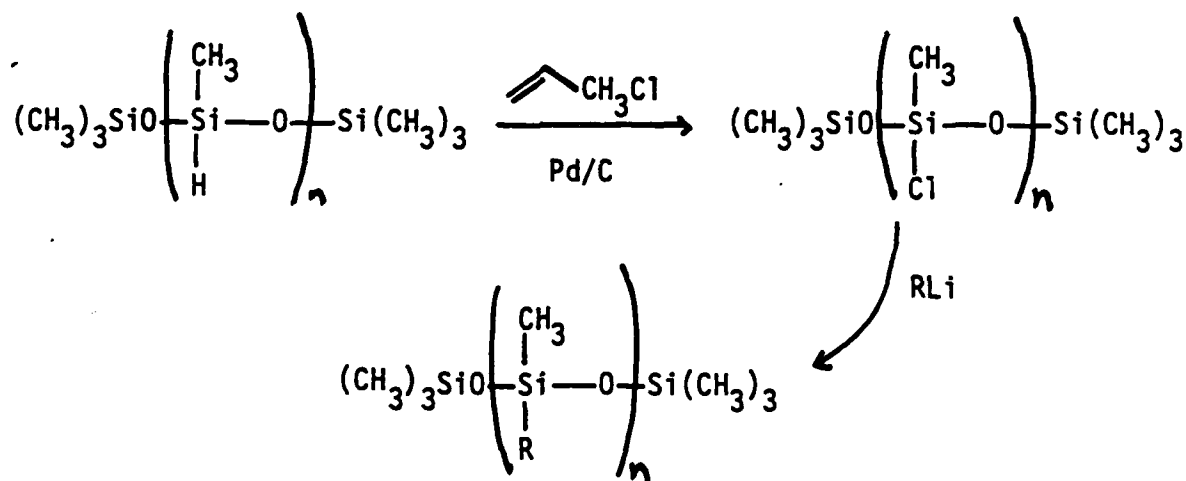
See publications 5, 6 and 11.

We have prepared 1,3-bis(silyl)adamantanes as outlined below.



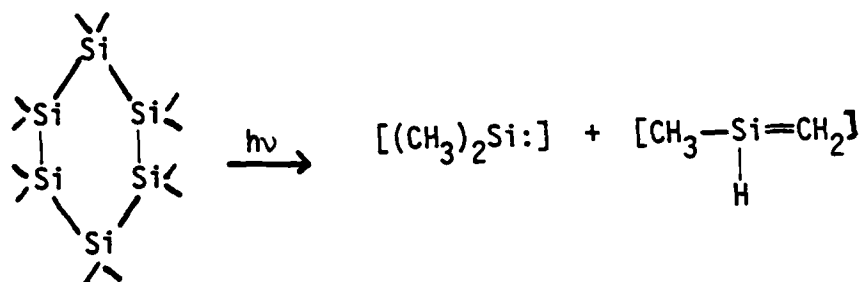
See publications 7 and 15.

We have chlorinated α,ω -bis(trimethylsiloxy)polymethylhydrosiloxane polymers to yield α,ω -bis(trimethylsiloxy)polymethylchlorosiloxanes. These reactive polymers have been reacted with alkyl lithium reagents to yield α,ω -bis(trimethylsiloxy) polyalkylmethylsiloxanes.

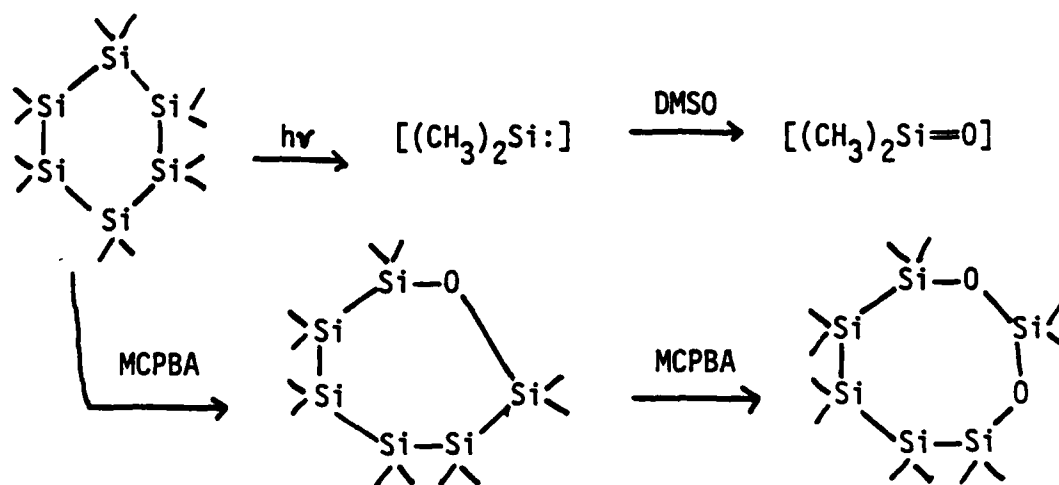


See publications 2 and 14.

We have found that photolysis of dodecamethylcyclohexasilane (II) yields both dimethylsilylene and methylsilene. The ultraviolet spectra of dimethylsilylene in solution and the kinetics of its reaction with various substrates have been determined. See publications 9 and 10.

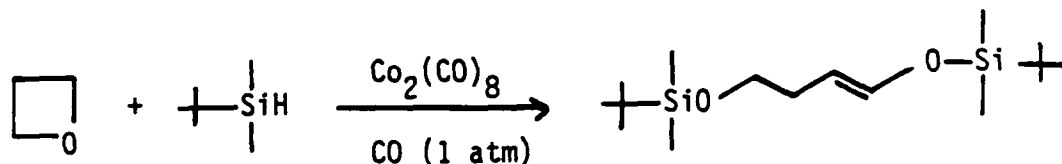


The oxidation of dimethylsilylene with sulfoxides yields silanones. The reaction of *m*-chloroperbenzoic with II selectively oxidizes Si-Si bonds adjacent to Si-O bonds.



See publications 1 and 3.

We have found that the use of the sterically hindered *t*-butyldimethylsilane permits control in the silyl hydroformylation reaction.



See publications 18 and 19.

We have utilized ^{29}Si NMR to explore T_1 (relaxation times) of polymethylhydrosiloxane polymers. See publication 12.

Deuterium isotope effects on ^{29}Si chemical shifts have been observed for the first time. See publication 20.

END

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