

# NOVEL TIN-SILICON CYCLES AS PRECURSORS FOR INORGANIC POLYMERS

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## Introduction

A large number of reports concerning cyclic silanes of type  $(R_2Si)_n$  or derivatives with silicon and carbon groups  $(-R_2Si-CH_2-)_n$  in the ring skeleton have appeared in literature<sup>1</sup>. However, only a few studies are focused on the synthesis and reaction behaviour of cyclic sila compounds that also contain the higher elements of group 14.

Here we report on the formation of carbon bridged silanes and the further on reaction with dichlorodiphenylstannanes in the presence of magnesium. The carbon spacer are either flexible alkylene chains or more rigid phenyl derivatives.

## Synthesis and Reaction

The reaction of 1, x- bis (chlorodimethylsilyl) propane (x=3,4,5) and diphenyldichlorostannane in the presence of magnesium leads to compounds of type 1. Irradiation of compound 1a with a UV-lamp (200- 600 nm) results on one hand in the tin free 1,1,2,2- tetramethyl- 1,2-disilacyclopentane (2) and, on the other hand, in  $Sn_3$ - $Sn_{12}$ -clusters. Compound 2 was identified by GC/MS and NMR spectroscopy. The  $Sn_3$ - $Sn_{12}$ - clusters were characterised by MALDI-TOF analysis.

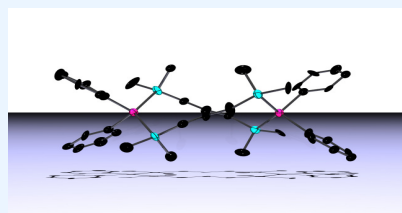
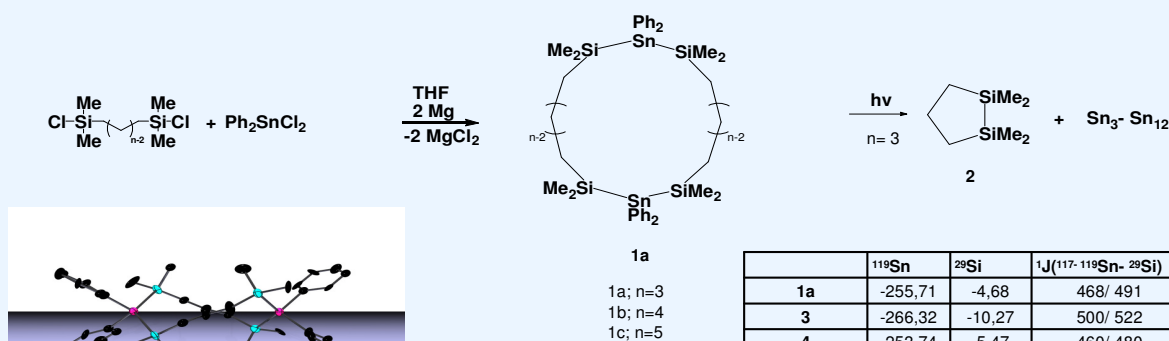
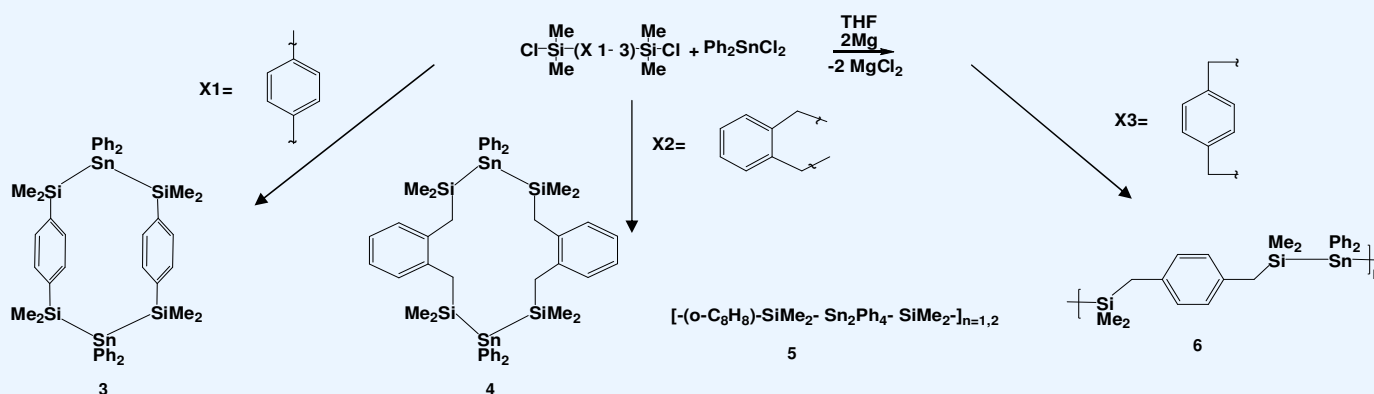


Figure 1: X-ray crystal structure of 1a

	<sup>119</sup> Sn	<sup>29</sup> Si	<sup>1</sup> J( <sup>117-119</sup> Sn- <sup>29</sup> Si)	<sup>1</sup> J( <sup>117</sup> Sn- <sup>119</sup> Sn)
1a	-255,71	-4,68	468/ 491	-
3	-266,32	-10,27	500/ 522	-
4	-253,74	-5,47	460/ 480	-
5	-236,6	-0,93	478/ 500	1372
6	Polymerspektrum, from -250 to -260 ppm; broad signal			

Tab 1: NMR- data of the different reactions.



The use of more rigid carbon spacer in a similar reaction to the one given above yields to surprising results.

The reaction of 1,4- bis (chlorodimethylsilyl) benzene and 1,2- bis (chlorodimethylsilylmethyl) benzene results in the expected formation of cyclic derivatives 3, 4 with two Si-Sn-Si units. In the latter case the formation of compound 4 is accompanied by a side reaction yielding product 5 with an Si-Sn-Sn-Si unit in the ring skeleton. Surprisingly, by using 1,4- bis (chlorodimethylsilylmethyl) benzene as starting material only a polymeric product was formed.

## References

1Klassen, R., Diploma Thesis,1996, Dortmund, Germany.