

## DOCTORAL THESIS

### New benzyne precursors: the chemistry of benzobisoxadisilole and benzotrisoxadisilole

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**New Benzyne Precursors —  
The Chemistry of Benzobisoxadisilole and  
Benzotrisoxadisilole**

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**A thesis submitted in partial fulfillment of the requirements  
for the degree of  
Doctor of Philosophy**

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## Abstract

The syntheses of linear and angular benzobisoxadisiloles **2.9** and **2.13** as well as benzotrisoxadisilole **2.28** were accomplished. They can serve as new benzyne precursors. Generation of benzynes (**2.15**, **2.22** and **2.30**) from benzobisoxadisiloles and benzotrisoxadisilole *via* the phenyliodination / fluoride induced elimination protocol were investigated.

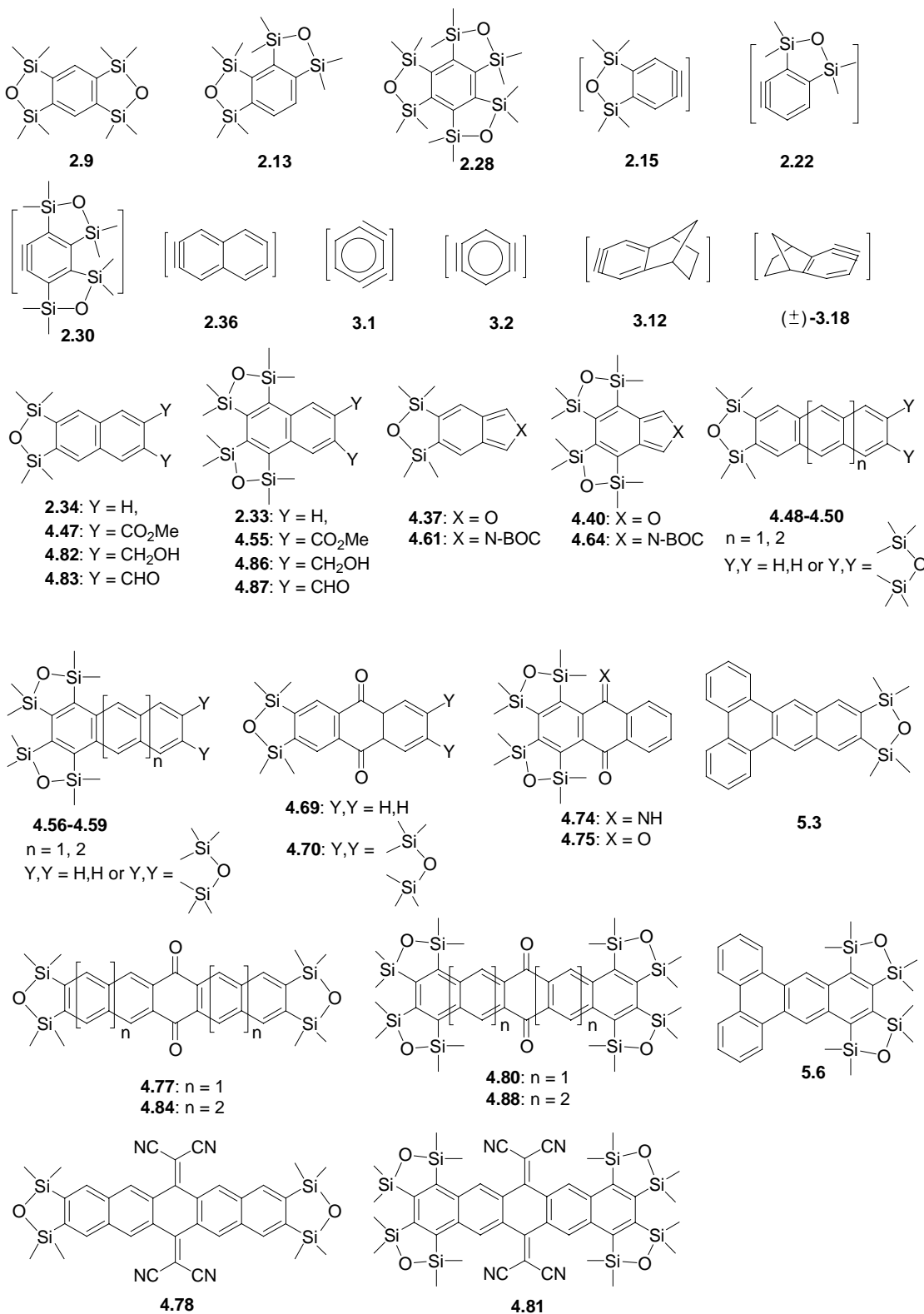
The linear and angular benzobisoxadisiloles can serve as synthetic equivalents of 1,4- and 1,3-benzdiyne (**3.2** and **3.1**) respectively *via* the phenyliodination / fluoride induced elimination protocol.

Mono- and bis-oxadisilole fused isobenzofurans (**4.37** and **4.40**) and isoindoles (**4.61** and **4.64**) were synthesized and isolated for the first time, they were used as the synthons for a series of mono- and bis-oxadisilole fused linear acenes (**4.47-4.50** and **4.55-4.58**) and acenequinones (**4.69**, **4.70** and **4.75**). The electrochemical and photo-physical properties of these oxadisilole fused acenes were characterized.

Bis- and tetra-oxadisilole fused pentacenequinones (**4.77** and **4.80**) and heptacenequinones (**4.84** and **4.88**) were synthesized *via* double Diels-Alder or 4-fold Aldol-condensation reactions.

Mono- and bis-oxadisilole fused dibenz[*a,c*]anthracenes **5.3** and **5.6** were also synthesized *via* palladium-catalyzed [2+2+2] cyclotrimerization reaction and aromatization. The electrochemical and photo-physical properties of these dibenz[*a,c*]anthracene derivatives was characterized.

The structures of 14 new compounds were also confirmed by X-ray analyses.



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