

## DOCTORAL THESIS

### **Anthracene capped benzoxadisilole, naphthoxadisilole and isobenzofuran: applications in the preparations of triptycynes and iptycene derivatives**

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**Anthracene Capped Benzoxadisilole,  
Naphthoxadisilole and Isobenzofuran —  
Applications in the Preparations of  
Triptycynes and Iptycene Derivatives**

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## Abstract

Starting from benzobisoxadisilole, anthracene capped benzoxadisilole **2.40** and naphthoxadisilole **2.41** were successfully synthesized. Replacing TBAF with KF/TBAF system was beneficial to the preparation of **2.40**. Microwave irradiated Diels–Alder reaction of anthracene and endoxide **2.58** with water as solvent and Ac<sub>2</sub>O/AcOH induced dehydration facilitated the synthesis of **2.41**. This process was also applied in the synthesis of a series of extended triptycenes with high efficiency.

Compounds **2.40** and **2.41** can serve as new precursors of triptycene **2.26** and extended triptycene **2.27** respectively *via* the phenyliodination / fluoride induced elimination protocol. These two arynes (**2.26** and **2.27**) were applied as effective intermediates in the synthesis of iptycene derivatives *via* Diels–Alder reactions.

Anthracene capped isobenzofuran **3.56** was generated for the first time. It is a highly reactive and versatile synthon for the synthesis of iptycene derivatives. Cycloadducts **3.60** were readily obtained from the cycloadditions of IBF **3.56** with various dienophiles. Deoxygenation of **3.60** afforded iptycene acenes **3.62**. Two new reactions of PhI(OAc)<sub>2</sub>/TfOH have been explored. In the presence of PhI(OAc)<sub>2</sub>/TfOH, endoxides **3.60** were directly oxidized to iptycene quinones **3.66**, and isobenzofuran **3.56** was conveniently converted to dialdehyde **3.70**. Two previously unknown H-shaped centrally extended pentiptycene quinones **3.67** and **3.68** were also synthesized through 4-fold aldol condensation reactions.

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