



GNITED MINDS
Journals

*Journal of Advances in
Science and Technology*

*Vol. V, Issue. IX, May-2013,
ISSN 2230-9659*

STUDY ON SILENES WITH REFERENCE TO THEIR PROPERTIES

Study on Silenes With Reference To Their Properties

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Abstract - In one study a disilene is prepared by an intramolecular coupling of a 1,1-dibromosilane with potassium graphite. The silicon double bond in the resulting compound has a bond length of 227 picometer (second largest ever found) with trans-bent angles 33° and 31° (by X-ray diffraction).

In addition to this the substituents around the Si-Si bond are twisted by 43°. The disilene isomerizes to a tetracyclic compound by heating at 110°C in xylene thereby releasing its strain energy. Siloles, also called silacyclopentadienes, are members of a larger class of compounds called metalloles. They are the silicon analogs of cyclopentadienes and are of current academic interest due to their electroluminescence and other electronic properties. Siloles are efficient in electron transport. They owe their low lying LUMO to a favorable interaction between the antibonding sigma silicon orbital with an antibonding pi orbital of the butadiene fragment.

Keywords- double bond, Siloles, silacyclopentadienes, electron transport.

INTRODUCTION

Silenes are compounds containing a silicon based chain, joined by a double bond to the main molecule, such as silylidenemethanol. Where it is the main functional group, the molecule is named after the parent silane, with the -ylidene- infix, such as methyldenesilane.

In one study a disilene is prepared by an intramolecular coupling of a 1,1-dibromosilane with potassium graphite. The silicon double bond in the resulting compound has a bond length of 227 picometer (second largest ever found) with trans-bent angles 33° and 31° (by X-ray diffraction).

In addition to this the substituents around the Si-Si bond are twisted by 43°. The disilene isomerizes to a tetracyclic compound by heating at 110°C in xylene thereby releasing its strain energy.

Siloles [edit]

Chemical structure of silole

REVIEW OF LITERATURE

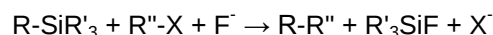
Siloles, also called silacyclopentadienes, are members of a larger class of compounds called metalloles. They are the silicon analogs of cyclopentadienes and are of

current academic interest due to their electroluminescence and other electronic properties.^{[13][14]} Siloles are efficient in electron transport. They owe their low lying LUMO to a favorable interaction between the antibonding sigma silicon orbital with an antibonding pi orbital of the butadiene fragment.

HYPERCOORDINATED SILICON

Unlike carbon, silicon compounds can be coordinated to five atoms as well in a group of compounds ranging from so-called silatranes, such as phenylsilatrane, to a uniquely stable pentaorganosilicate:

The stability of hypervalent silicon is the basis of the Hiyama coupling, a coupling reaction used in certain specialized organic synthetic applications. The reaction begins with the activation of Si-C bond by fluoride:



MATERIAL AND METHOD

Certain allyl silanes can be prepared from allylic ester such as 1 and monosilylcopper compounds such as 2 in.^{[16][17]}

In this reaction type silicon polarity is reversed in a chemical bond with zinc and a formal allylic substitution on the benzoyloxy group takes place.

- Compounds of carbon with period 3 elements: organoaluminum compounds, organosilicon compounds, organophosphorus compounds, organosulfur compounds,
- Compounds of carbon with other group 14 elements: organosilicon compounds, organogermanium compounds, organotin compounds, organolead compounds.
- silylenes, the carbene counterparts and silylenoids the carbenoid counterparts.

Stannole is an organotin compound with the formula $(\text{CH})_4\text{SnH}_2$. It is classified as a metallole, i.e. an unsaturated five-membered ring containing a heteroatom. It is a structural analog of pyrrole, with tin replacing the nitrogen. Substituted derivatives, which have been synthesized, are also called stannoles.^[1]

Examples

1,1-Dibutylstannole is a pale yellow oil prepared from 1,4-dithio-1,3-butadiene and dibutyltin dichloride^[2]

CONCLUSION

1,1-Dimethyl-2,3,4,5-tetraphenyl-1*H*-stannole, for example, can be formed by the reaction of 1,4-dithio-1,2,3,4-tetraphenyl-1,3-butadiene and dimethyltin dichloride. 1,1-Disubstituted stannoles can be formed in the [2+2+1] cycloaddition reaction of two acetylene molecules with an organotin molecule SnR_2 .

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[^] E.g., B.L. Lucht, D.B. Collum "Lithium Hexamethyldisilazide: A View of Lithium Ion Solvation through a Glass-Bottom Boat" *Accounts of Chemical Research*, 1999, volume 32, 1035–1042 doi:10.1021/ar960300e, and references therein.