Power Lecture

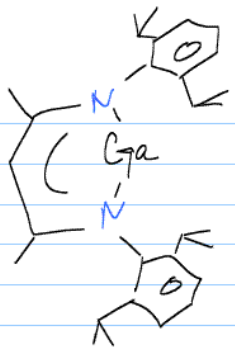
Note Title 3/3/2005

Objective: "pure σ donor-acceptor complex"

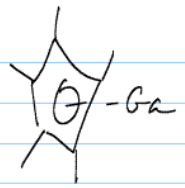
Ga/B donor-acceptor

interest in lone pair on Ga^{I} center

comparison with Ga^{I} ligation to d-block elements



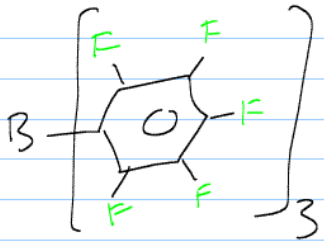
monomer in solid state



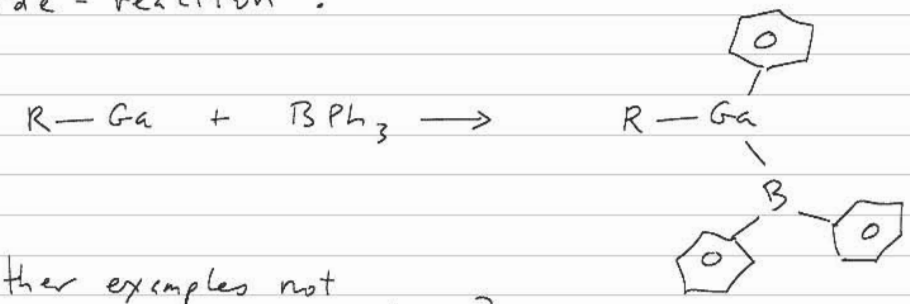
monomer in vapour phase

Donors

Acceptor:



- maybe BPh_3 did not stick to Ga ?
- side-reaction ?



- other examples not crystalline ?

$\sum$ C–B–C angles reflects Lewis Basicity of the donor.

⊙ $R-Ga^{I}$ comparable to other typical electron-pair donors.

Conclusion tempered :

$\sum$ C–B–C angles may also respond to interligand steric interactions.

Note added in proof :

P. Jutzi $Cp^{*}GaB(C_6F_5)_3$

Octatin, tetraaryl system.

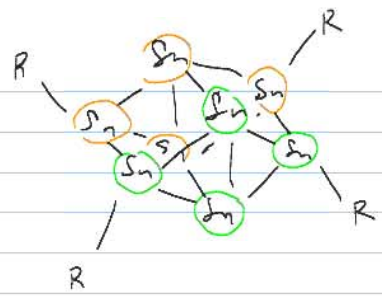
Angewandte 2001.

objective: $(SnR)_4$

note also Zintl ions e.g. Sn_m^{n-}

result: a product in-between,

a metalloid cluster a la Schnöckel



R = DMP

38% yield

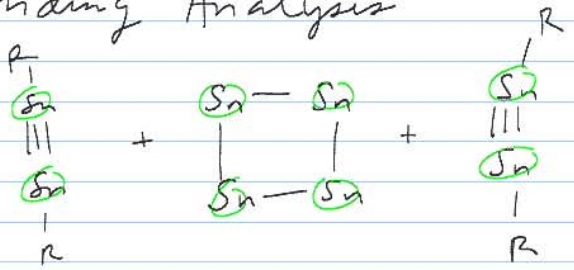
purple xtals

K

RSnCl

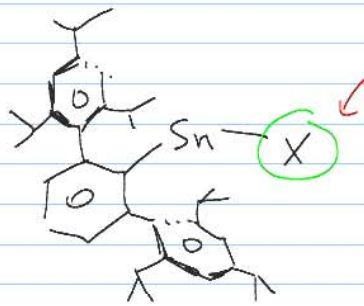
THF

Bonding Analysis



20 cluster bonding electrons if Sn_4 all divalent.

^{119}Sn Solid-State NMR



No logical correlation between X and δ_{iso}

With solid-state NMR,

one can relate molecular structure

to δ_{11}, δ_{22}, and δ_{33}.

$$\delta_{iso} = \frac{\delta_{11} + \delta_{22} + \delta_{33}}{3}$$

large CSA

⇓

singlet, closed-shell molr.

$$\delta = \delta_{dia} + \delta_{para} + \delta_{s.o.}$$

asymmetry at β_n

↑ Core

↑ occ.-vir.