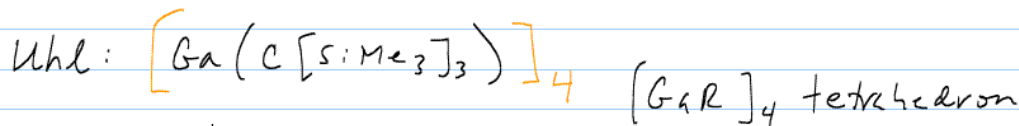


Uhl

Note Title

2/24/2005

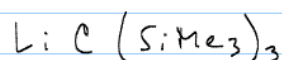
Marburg - colleague Gernot Frenking  
theorist



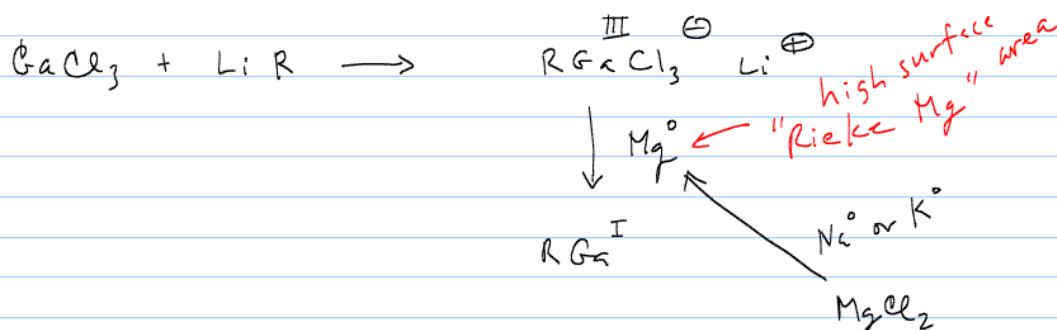
↓ benzene

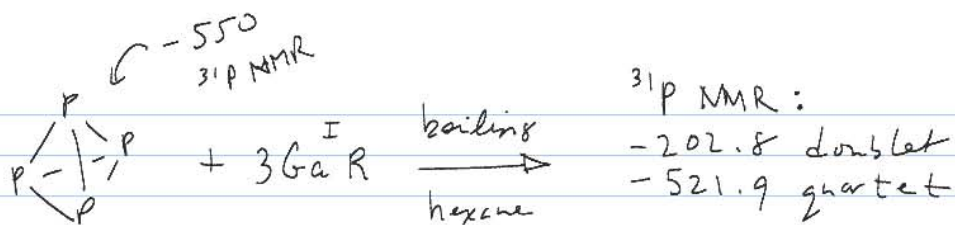
4  $GaR$  } red in benzene  
available for sol<sup>n</sup> chemistry  
frontier orbitals  $\leftrightarrow$  CO

1991 Uhl made solvent-free



one route: solution phase  $Ga^I$

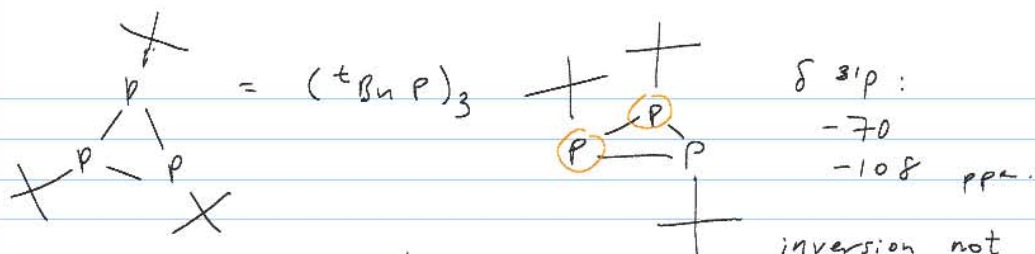
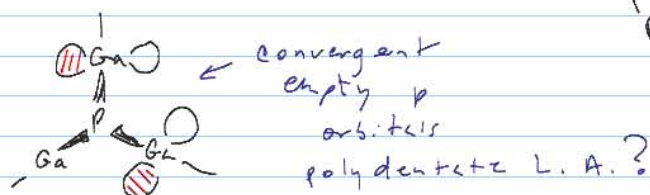




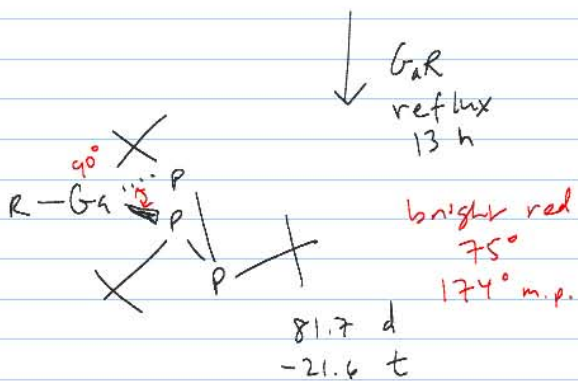
idea: insert GaR into strained E-E bonds.

is  $\text{P}_4$  a strained molecule?

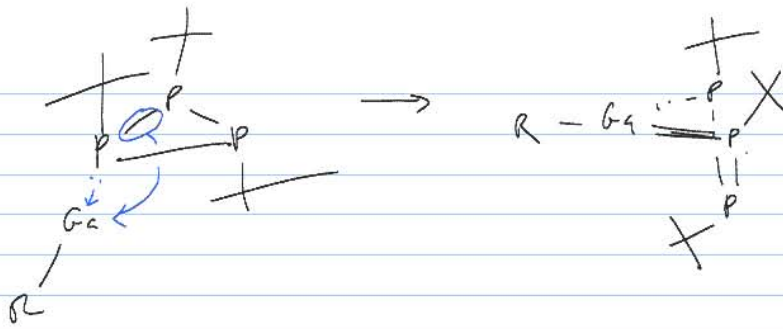
60° angles  $\text{P-P-P}$ , 90° optimal  $\text{R-Ga-P}$   $\text{C}_{3v}$



inversion not facile for P.

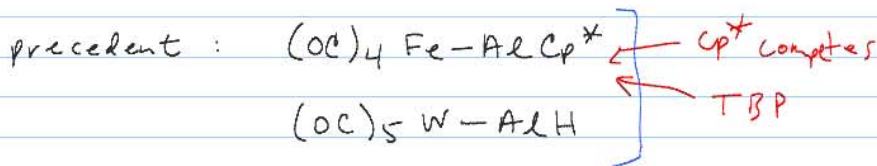


- no further insertions
- $\text{InR}$  does not react
- $(\text{P}^{\text{tBu}})_4$  gives no reaction with  $\text{GaR}$



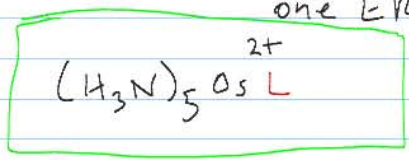
Group 13 ER as CO analogs.

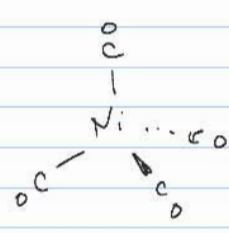
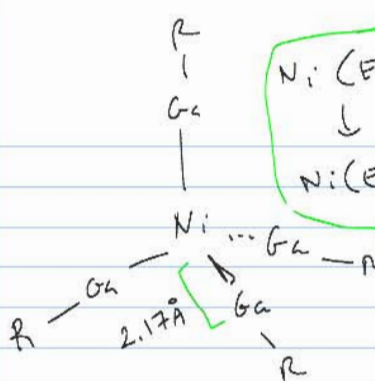
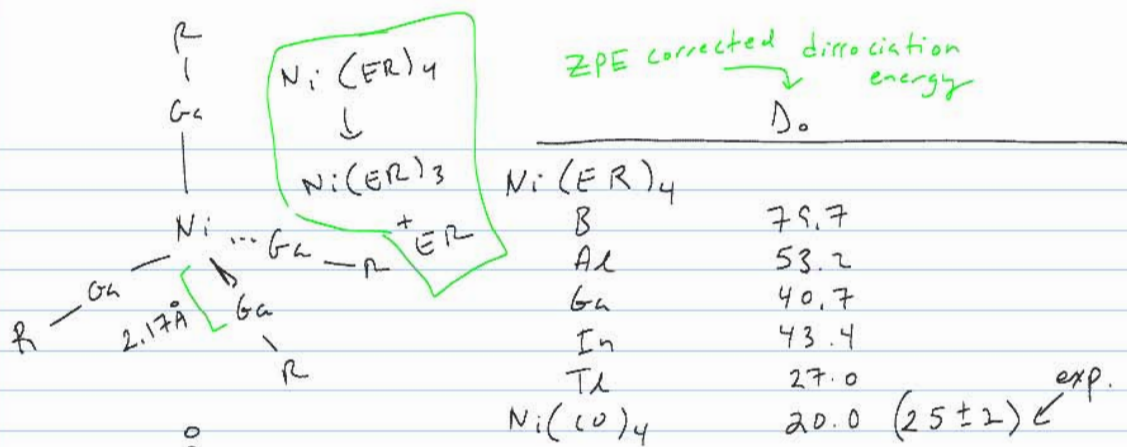
Sought: molecules with ER ligands that lack other  $\pi$ -acids in coord sphere.



Best case scenario? only ER ligands "homoleptic"

one ER ligand + n  $\sigma$ -only ligands.





Charge Density Analysis - Frenking  
 → modern: EPA  
 energy partitioning analysis  
 separate  $\sigma$  from  $\pi$  effects.