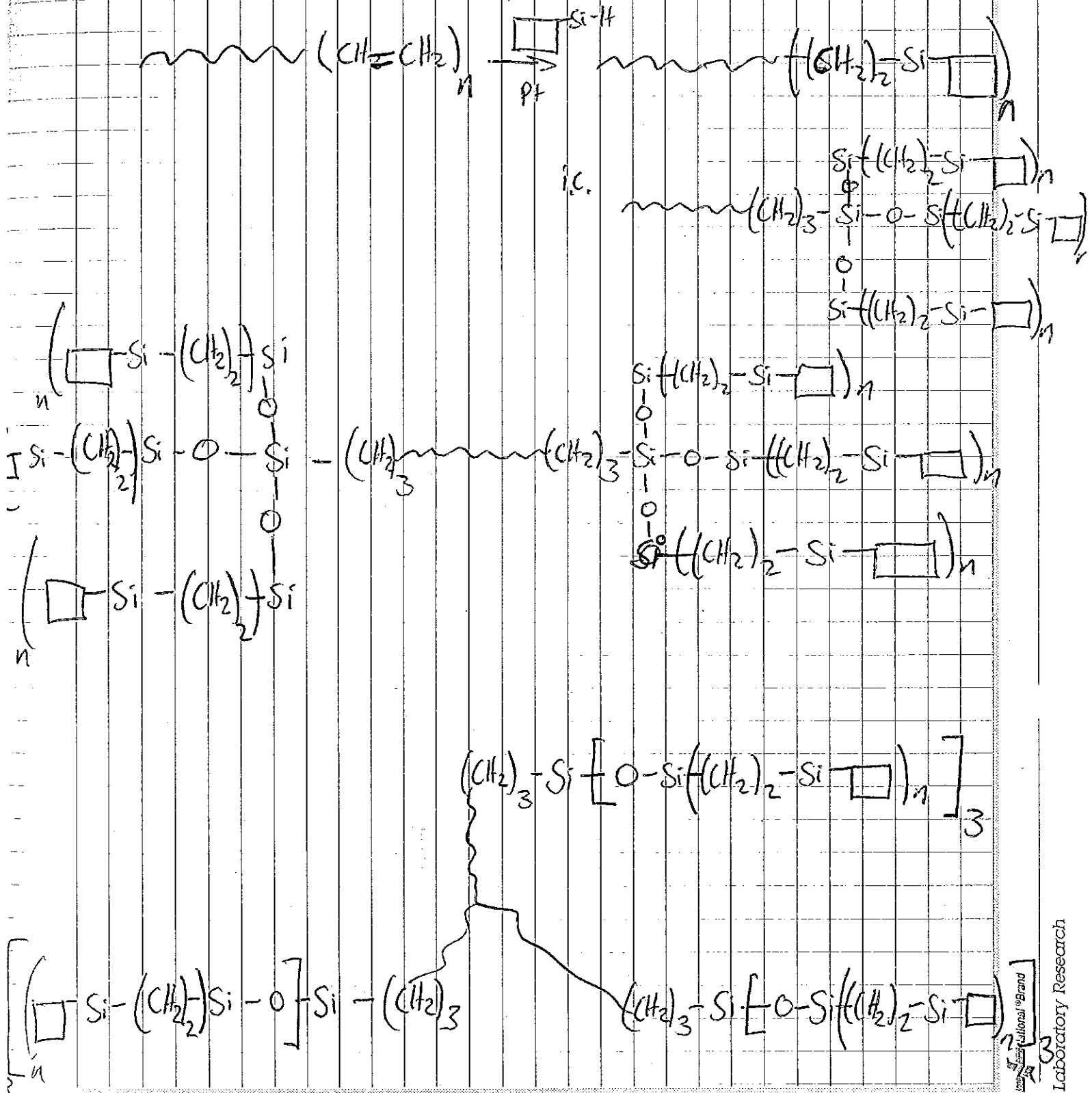
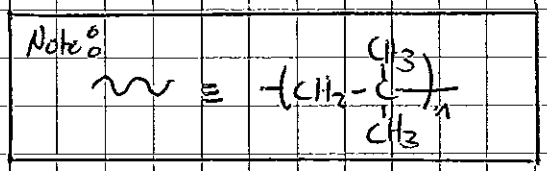
Any of the multiple vinyl or allyl analogs of the basic structures (see pg 07) as described on pages (09-11 of this book) can be combined with the hydrido POSS (08 this book) to give the following



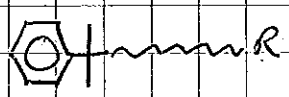
I will rewrite the material from pages 07-12 of this notebook because it is a MESS.

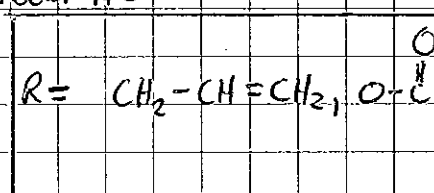
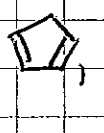
IB will be polymerized under living conditions— (BCl3 chloride / TiCl4 / -80°C / etc.) to yield the following materials:

Note:

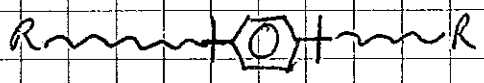


A) monofunctional, or functionally terminated linear PIB



where R = $CH_2-CH=CH_2$,  , OH, NH_2, 

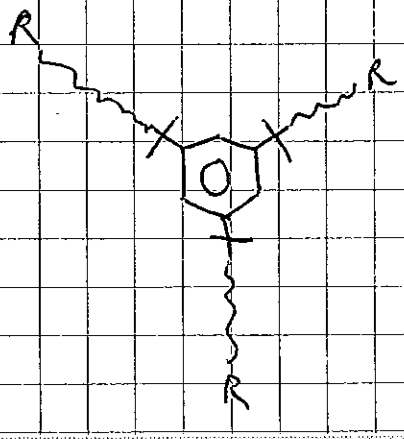
B) telechelic PIB's



where R = Prev. defined groups above

C) functionalized Star PIB's

where R = Prev. defined groups above



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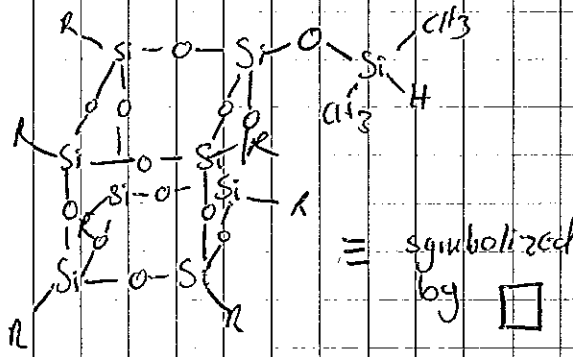
Important: Place card under blue copy.

Materials A, B, and C (pg 13) that have R = $CH_2-CH=CH_2$ can be reacted with 1-[hydridodimethylsiloxy]-3,5,7,9,11,13,15-heptacyclopentylpentacyclo[9.5.1.$1^{3,9}$.$1^{5,15}$.$1^{7,13}$] octasiloxane:

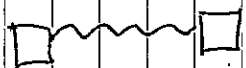


≡ symbolized by

in dry THF in the presence of a Pt catalyst under Ar (g) at reflux to give the following materials:

if "A" is used with R = $CH_2-CH=CH_2$

if "B" is used with R = $CH_2-CH=CH_2$



if "C" is used with R = $CH_2-CH=CH_2$

Similar reaction of the above noted POSS with materials A, B, and C that have R =  under similar conditions should lead to the following materials:

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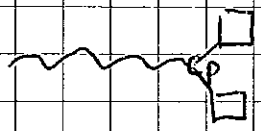
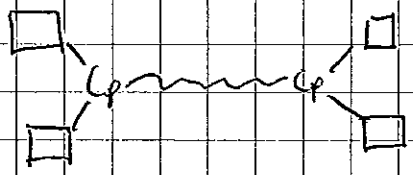
if "A" is used with R = 

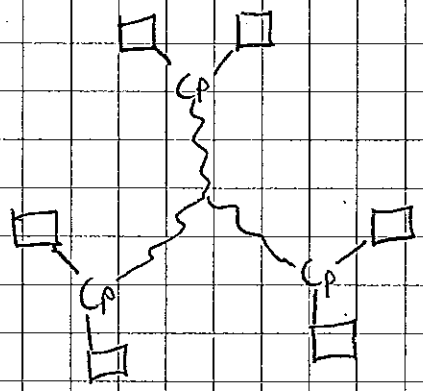


Note Cp = cyclopentadienyl

if "B" is used with R = 



if "C" is used with R = 



Two promising ways of introducing more C=C groups on the ends of PIB are as follows:

1) Hydrosilylation of A, B, and C with R = $CH_2-CH=CH_2$ with $H-SiCl_3$ followed by hydrolytic condensation (controlled may be non-hydrolytic) with $=Si(R')(R'')-OR$

where R' and R'' can be = vinyl, methyl (alkyl)

A simple example leading to 3 vinyl groups may be as follows

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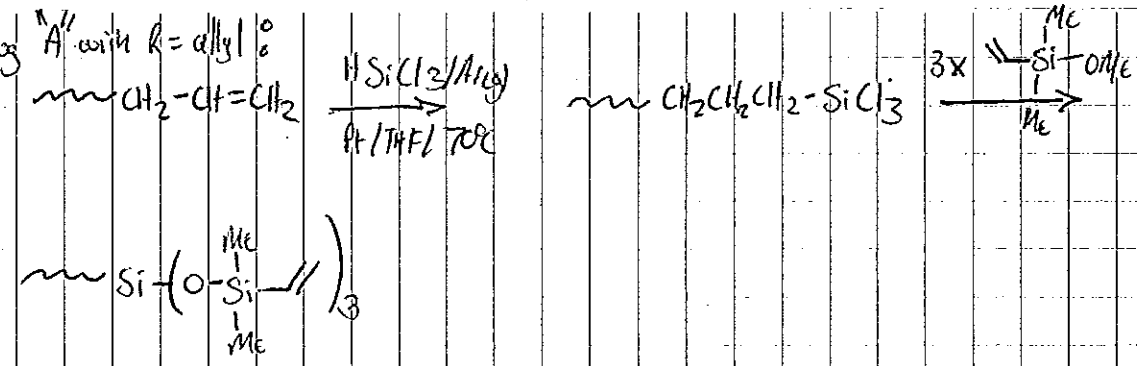
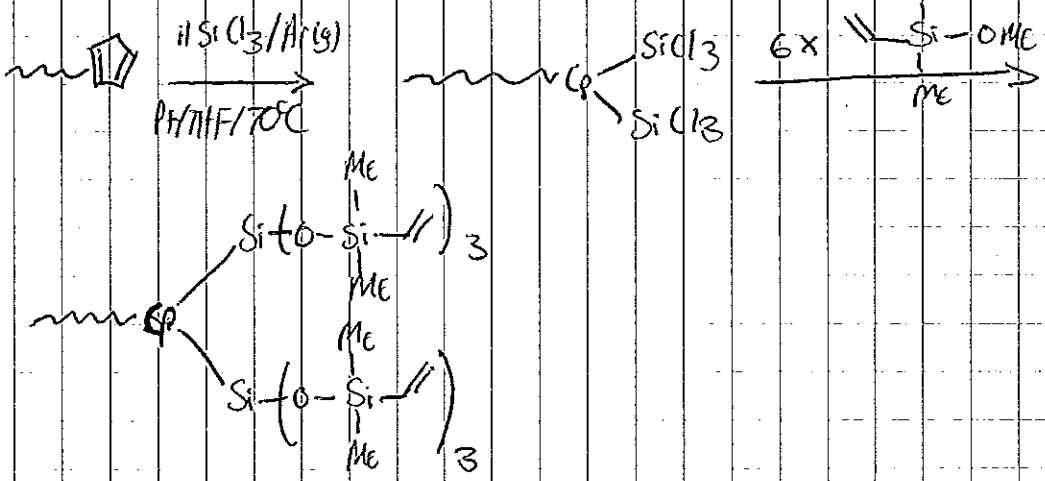
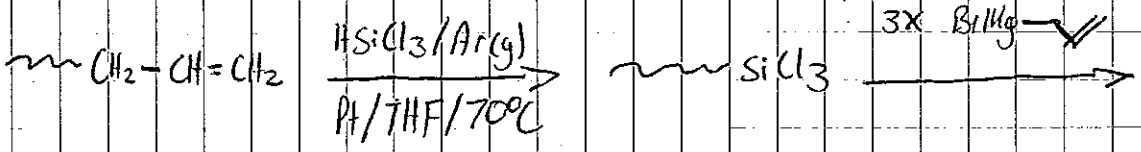
Using "A" with R = allyl

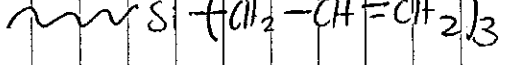


Similar MW's can be done using A, B, C with R =  to give 6 vinyl groups at each functionalized end. For example



2) Another method could be reaction of a grignard with a chlorosilane derived from A, B, or C where R = $CH_2-CH=CH_2$. For example:





As is with "I" you can add C=C bonds in multiples of 3 to the functionalized ends of PIB.

Important:

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