

SUBJECT - CHEMISTRY
CLASS - BSc(Hons) PART-I
PAPER : I
GROUP : A

Page No - 01
Date - 24.04.20

TOPIC : ORGANOSILICON COMPOUNDS AND THE SILICONES

Dr Hasi Mohan Prasad Singh

Department of Chemistry

Dr L.K.V.D College Tarapur Samastipur

Organosilicon compounds

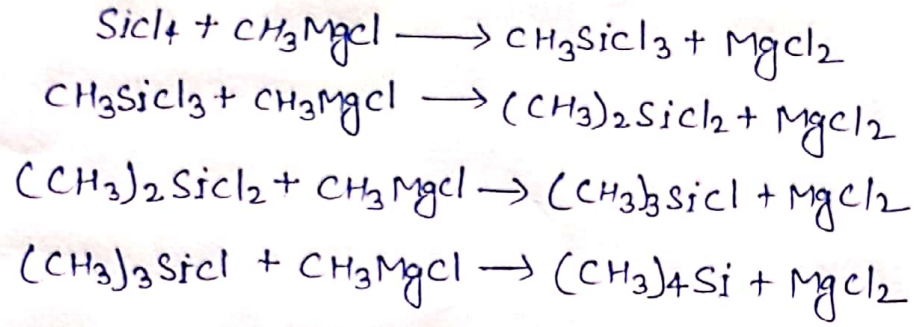
Si-C bonds are almost as strong as C-C bonds. Thus Silicon Carbide SiC is extremely hard and stable. Many thousands of organosilicon compounds. Many of these are inert, and stable to heat (e.g. SiPh₄ can be distilled in air at 428°C). However, the vast range of organic compounds is not replicated by silicon for three main reasons:

1. Silicon has little tendency to bond to itself (catenate) whilst carbon has a strong tendency to do so. The largest chains formed by Si are contained in Si₁₆F₃₄ and Si₈H₁₈. but these compounds are exceptional. This is related to the weakness of Si-Si bonds in contrast to the strength of C-C bonds.
2. Silicon does not form pπ-pπ double bonds. whilst carbon does so readily. (Note that a disilene Me₂Si=SiMeH has been isolated, but only by using matrix isolation methods with solid argon. Various transient reaction species with Si=C and Si=N bonds are known, and (Me₃Si)₂Si=C(OSiMe₃)(C₁₀H₁₅) exists as crystals at room temperature, and is stable in the absence of air. These are rare exceptions.)
3. Silicon forms a number of compounds containing pπ-dπ double bonds in which the silicon atom uses d orbitals.

Preparation of organosilicon Compounds

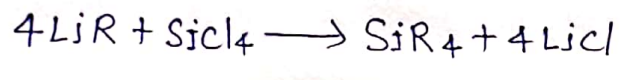
There are several ways of forming Si-C bonds:

1. By a Grignard reaction



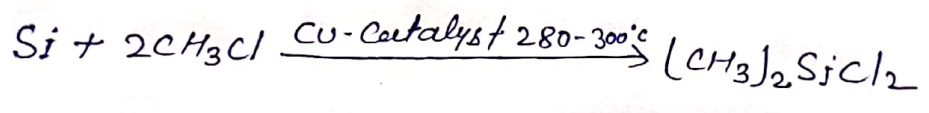
This is useful in the laboratory, or on a small scale.

2 Using an organolithium compound



This also is useful in the laboratory, and R may be alkyl or aryl.

3 By the Rochow 'Direct process', Alkyl or aryl halides react directly with a fluidized bed of Silicon in the presence of large amounts (10%) of a copper catalyst.



This is the main industrial method for making methyl and phenyl chlorosilanes which are of considerable commercial importance in the production of Silicones.

4 Catalytic addition of Si-H to an alkene. This is a useful general method, but is not applicable to making the methyl and phenyl silanes required by the silicone industry.