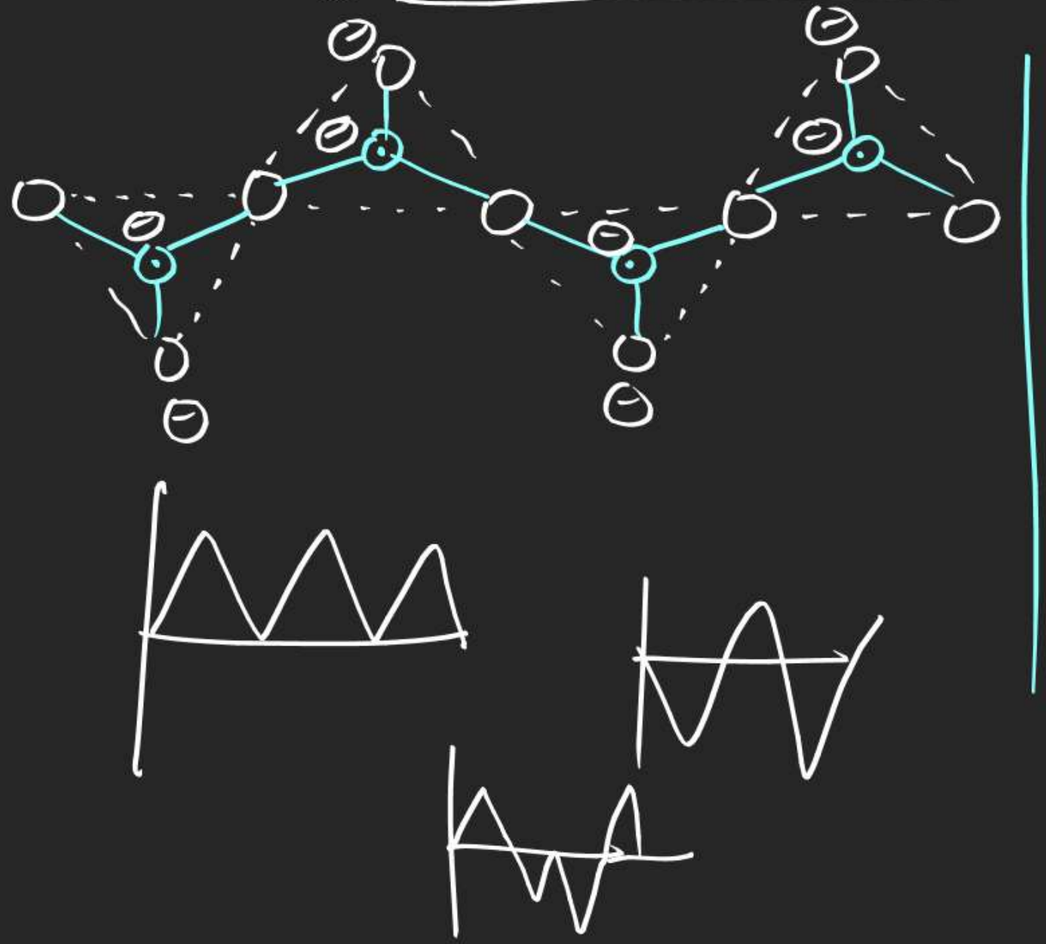
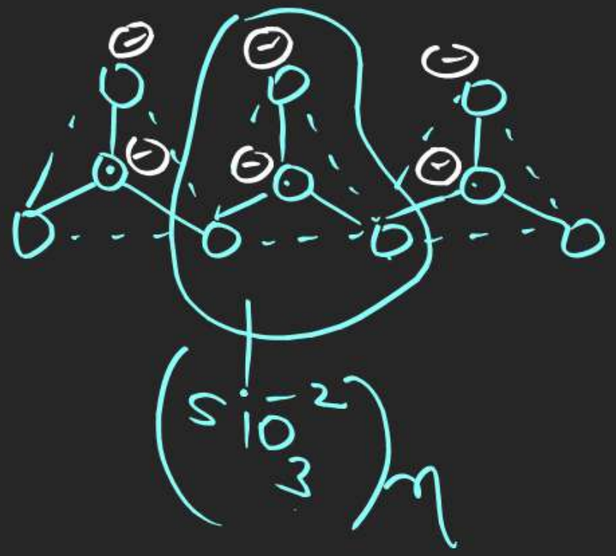
Nishant Jindal

# CHEMICAL BONDING

## Single Chain Silicate





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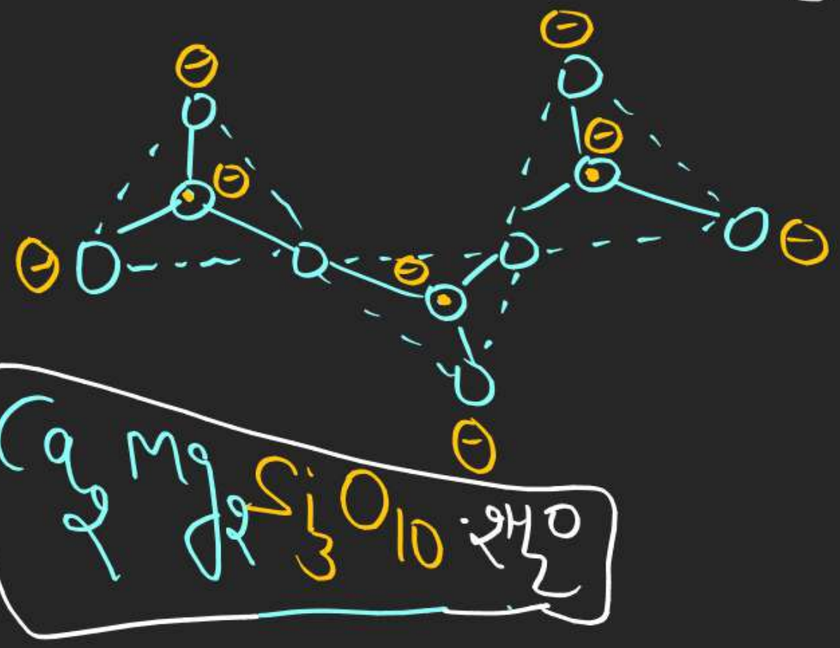
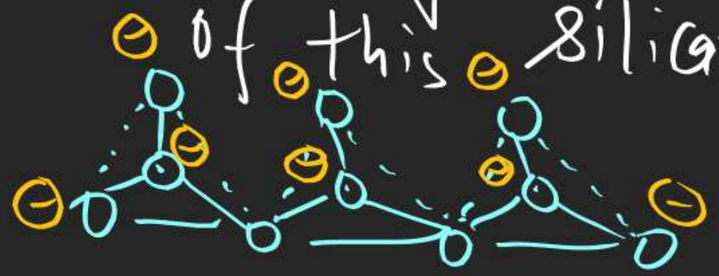
$Ca_2Mg_2Si_3O_{10}\cdot 2H_2O$ ans

When three $SiO_4^{4-}$ unit undergoes in single Chain polymerisation and it's anionic part satisfied with Ca and Mg if it's molecular formula Contain $H_2O$ in same ratio of Ca and Mg. then Identify the molecular formula of this silicate



$Si_3O_{10}^{-8}$

example — $[CaMg(SiO_3)_2]$

diopsite

Single Chain

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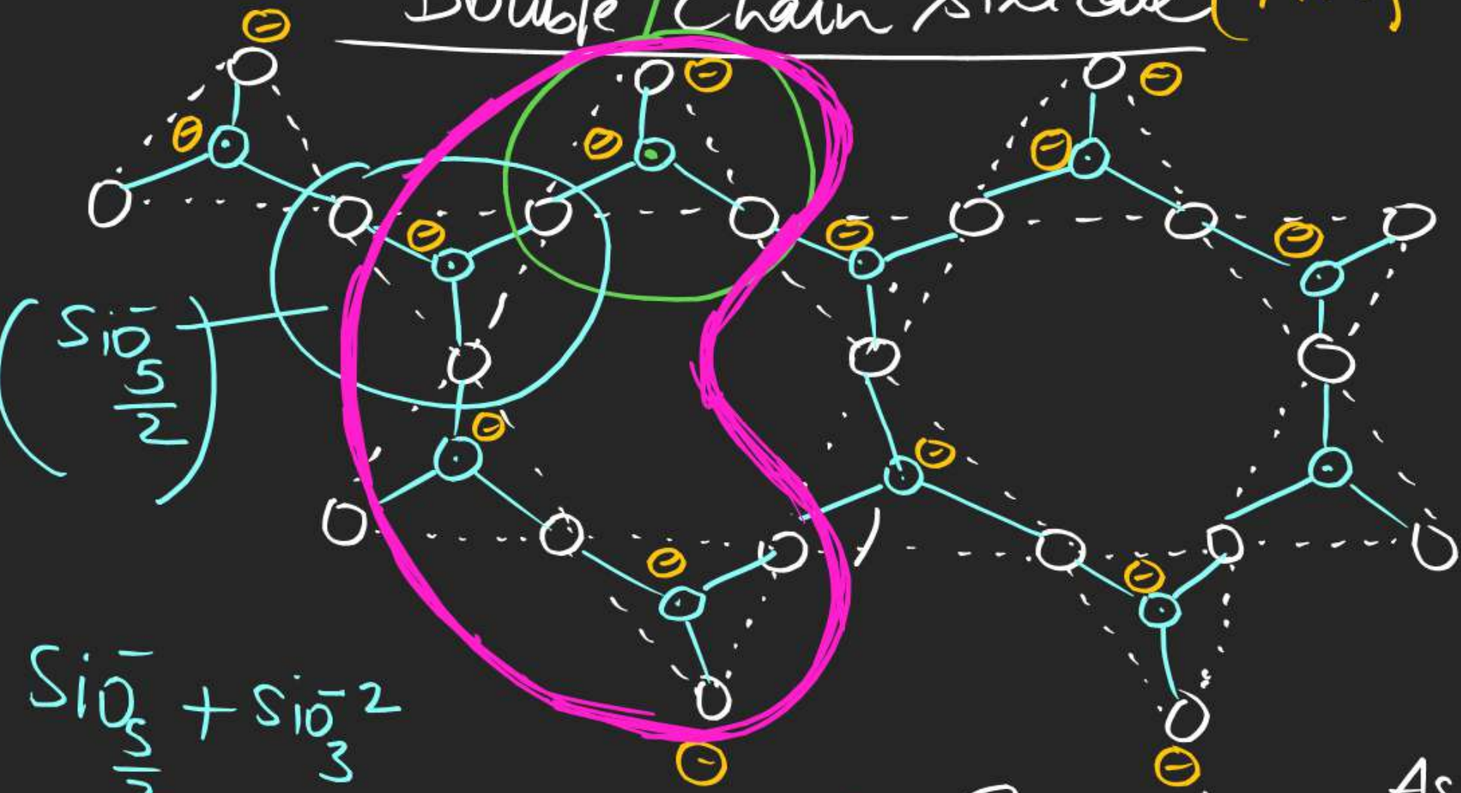
# Double / Chain Silicate ($SiO_3^{-2}$) (Amphibole)

avg oxygen shared = 2.5

avg oxygen $= \frac{3+2}{2} = 2.5$



$SiO_{\frac{5}{2}}^{-} + SiO_3^{-2}$

$Si_2O_{11}^{-3} \times 2 = Si_4O_{11}^{-6}$

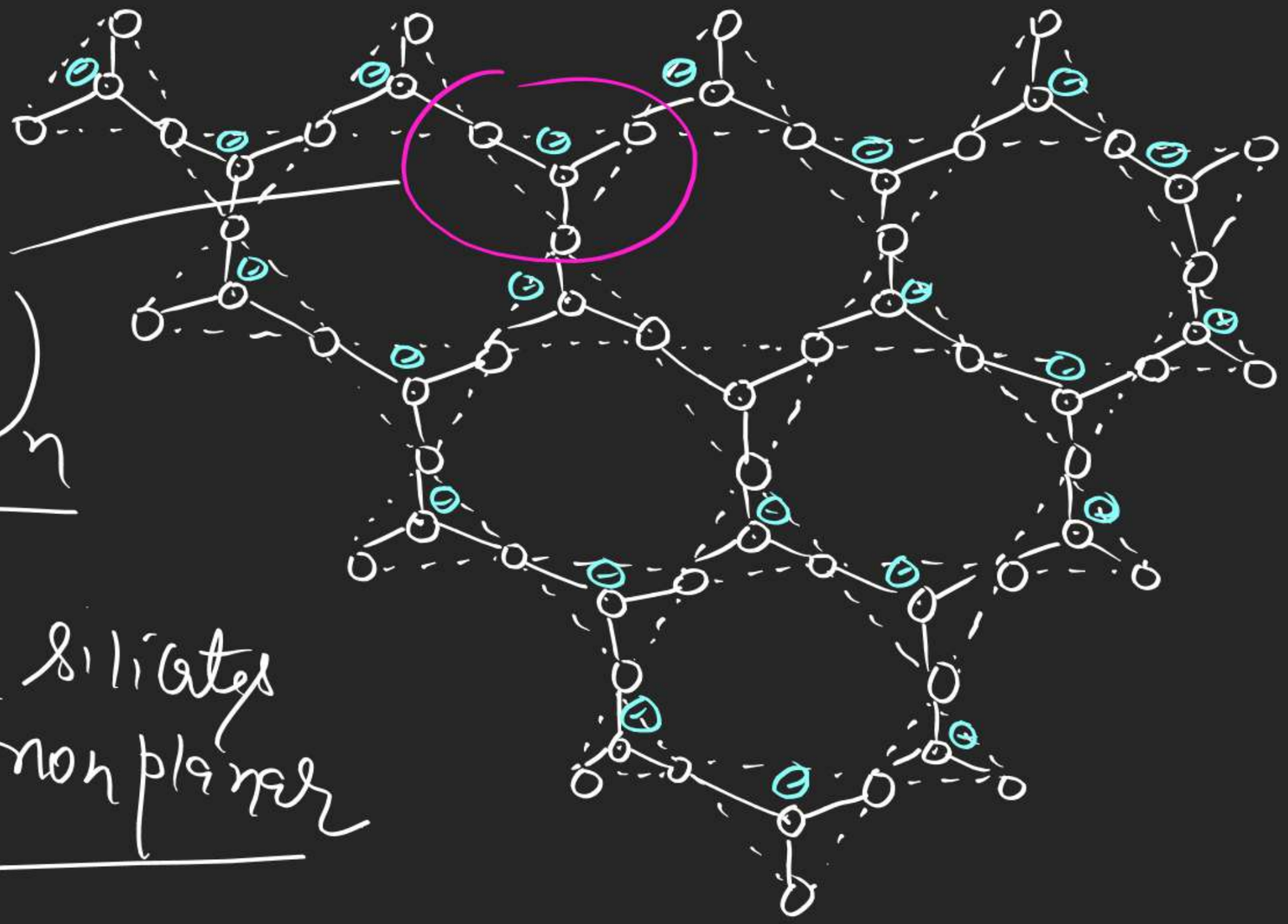
Example → Asbestos

# 2D, Sheet Silicate

example

Clay, mica

$(SiO_{\frac{5}{2}})_n$



Note ⇒ all silicates are non planar

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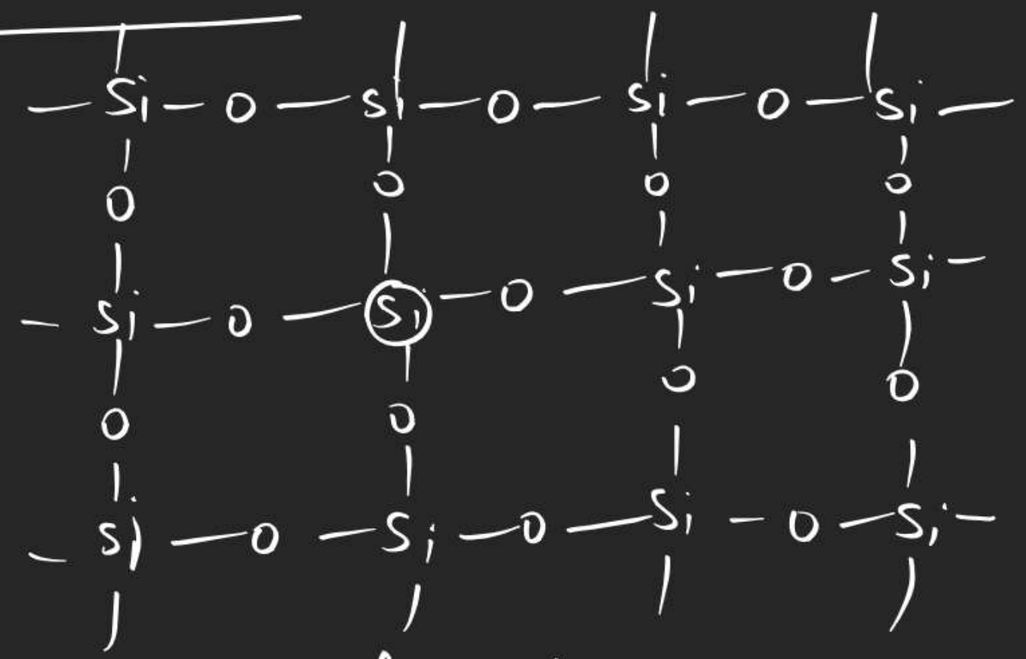
# 3D Silicate / tecto

**Note** ⇒ Cement and glass → man made silicate

**Unit** = $(SiO_2)$



- Quartz
- Feldspar
- Zeolite
- lapis lazuli
- Ultramarin

alumino silicate

Bluestone

3D network like structure non planar

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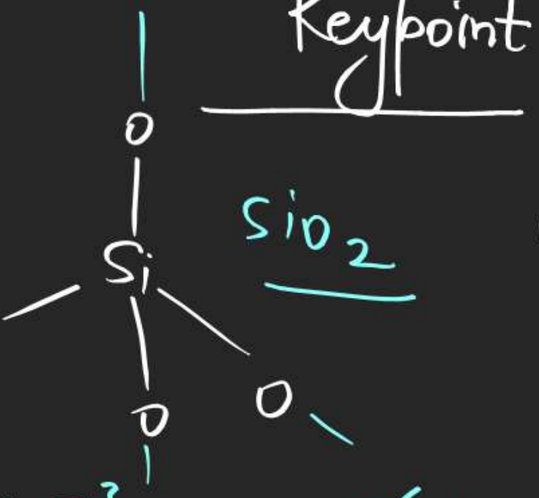
Amphibole — $Si_4O_{11}^{-6}$

Keypoint



$SiO_2$

$(SiO_{\frac{3}{2}}^{-})_n$

$SiO_7^{-3} \times 2 - (Si_2O_7^{-6})$

Cyclic — $(SiO_3^{-2})_n$

Single chain

$SiO_4^{-4}$

ortho (Neso | Island)

Pyro (Disilicate) (Soro)

Cyclic

Single chain (Pyroxe)

Double (chain) (Amphibol)

2D sheet (Phyllo)

3D Silicate | Tecto)

# Molecule donot exist

donot exist due to absence of d-orbital contraction

- $PH_5$ ✗
- $PF_5$ | $PCl_5$ ✓
- $XeH_4$ ✗
- $XeF_4$
- $XeH_6$ ✗
- $XeF_6$
- $SH_4$ ✗
- $SF_4$
- $SH_6$ ✗
- $SF_6$
- $ClI_3$ ✗
- $ClF_3$
- $(SiH_6)^{-2}$ ✗
- $(SiF_6)^{-2}$

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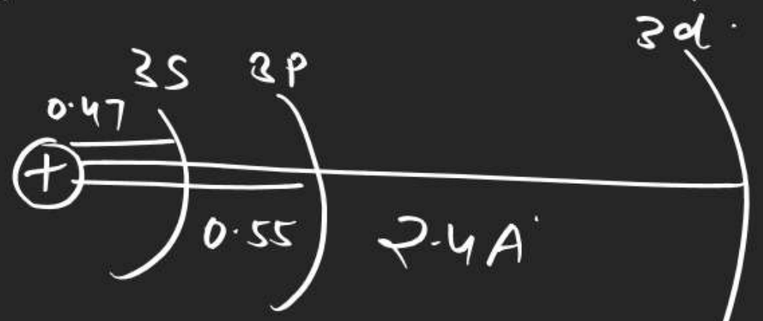
$P = 1s^2 2s^2 2p^6 3s^2 3p^3$ 3d




acc. to Radial distance data 3d present at higher energy level so 3d does not involve in Hyb. but if surrounding atom is more E.N than central atom it develop positive charge on central so it attract 3d orbital and 3d orbital involve in Hyb.

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# Odd $e^-$ molecule

Odd $e^-$ bond formation

| | total number of $e^-$ |
|---|---|
| NO | 15 |
| $NO_2$ | 23 |
| $ClO_3$ | 41 |
| $OF^-$ | 17 |
| $O_2^-$ | 17 |
| $ClO_2$ | 31 |

dimer

Odd $e^-$ molecule bond

- $A \overset{x}{-} B$ $H_2^+$ $Na_2^+$
- $A \overset{x \infty}{=} B$ $NO$ $O_2^-$ $ClO_2$

① all odd $e^-$ molecules are paramagnetic

H.W

DPP — up to Silicate

Sheet — up to Silicate

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