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CHEMICAL BONDING

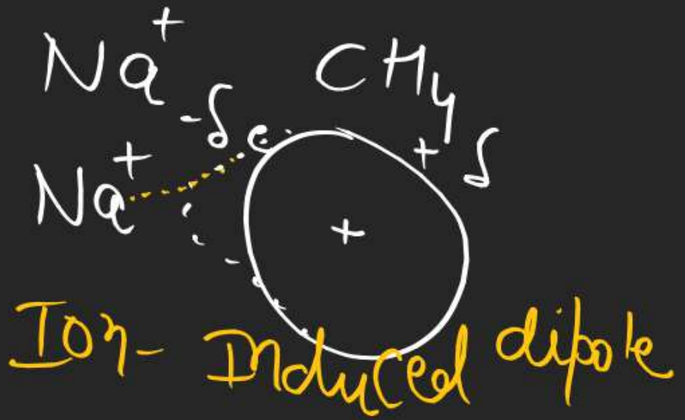
V.W.F

(1) dipole – dipole [keesom force]

(2) dipole – Induced dipole [debye force]

(3) **Ion – dipole**

(4) Ion – Induced dipole



Ion – Induced dipole

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(Weak forces)

$K^+ \cdots\cdots Br_2 — H$ ($-\delta$ $+\delta$)

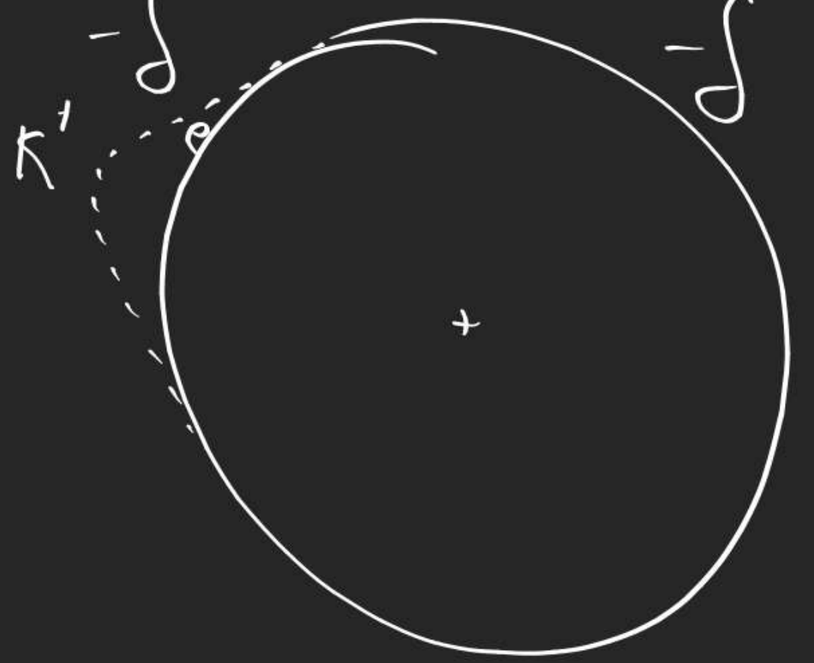
Ion- dipole

$K^+ \cdots\cdots CCl_4$

Ion- Induced dipole

When size of non polar molecule increases then

Ion - Induced dipole



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CHEMICAL BONDING

Imp

[L·D·F]

Instantaneous dipole - Induced dipole

[London dispersion force]

Hydrogen gas liq.

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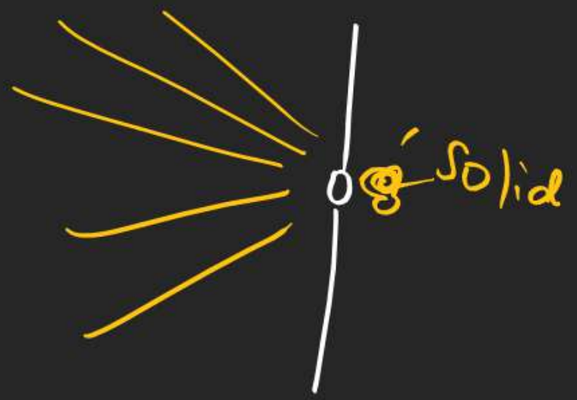
CHEMICAL BONDING

one Cause of intermolecular forces

(i) liq.

(ii) non ideal nature of gas

(iii) Joul Thomson effect



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Instantaneous dipole - Induced dipole

Instantaneous dipole - Induced dipole

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CHEMICAL BONDING

Que L·D·F works in

(1) polar molecule

(2) Non polar molecule

(3) both

(4) none

Que L·D·F dominate in

(a) Polar Molecule

(b) Non polar molecule

(c) both

(d) none

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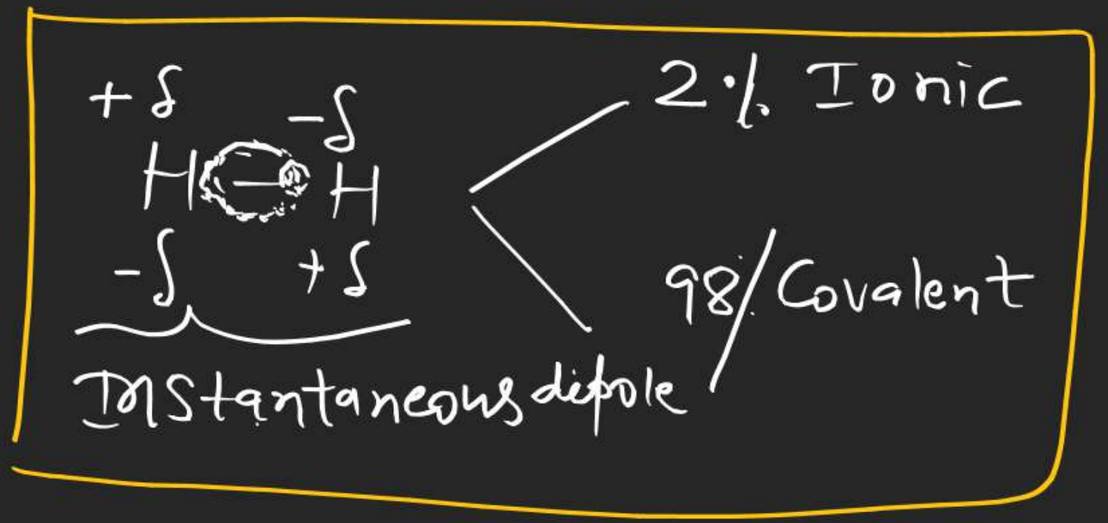
CHEMICAL BONDING

Experimentally 100% Covalent bond is not possible due to L·D·F (T/F)

Imp:



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CHEMICAL BONDING

Que on time avg. the molecule is non polar but at particular time it can acts as dipole (T/F)

Ans = T [due to L.D.F]

Que Weakest force is

(1) dipole - dipole (2) dipole - Induced dipole

(3) Ion - dipole (4) Ion - Induced dipole

(5) L.D.F

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CHEMICAL BONDING

order

H—Cl ..... H—Cl

Ion-dipole > dipole-dipole > Ion-Induced dipole > dipole-Induced dipole

E

Ion-dipole $\propto \frac{1}{r^2}$
dipole-dipole $\propto \frac{1}{r^3}$
Ion-Induced dipole $\propto \frac{1}{r^4}$
dipole—Induced dipole $\propto \frac{1}{r^6}$
L·D·F $\propto \frac{1}{r^6}$

> L·D·F

(500 pm)

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CHEMICAL BONDING

Cumulative force in polar molecule

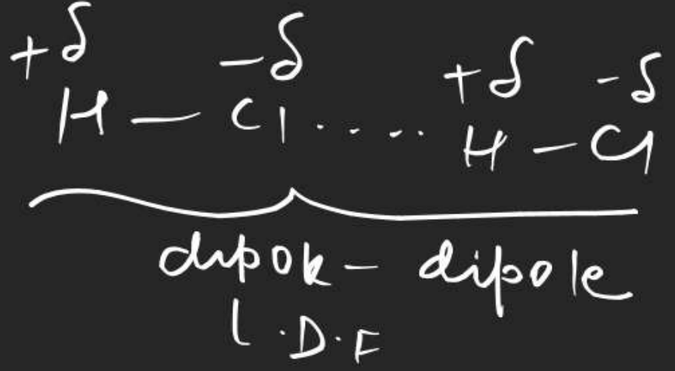
(3) dipole - dipole only

(5) L.D.F only

(1) both (a) and (b)

(4) none

one



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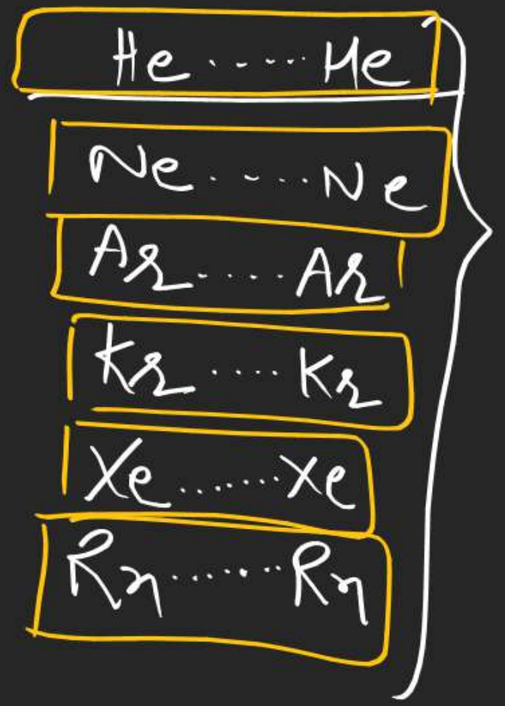
CHEMICAL BONDING

Noble gas



L.D.f ↑ because size ↑ of Noble gas

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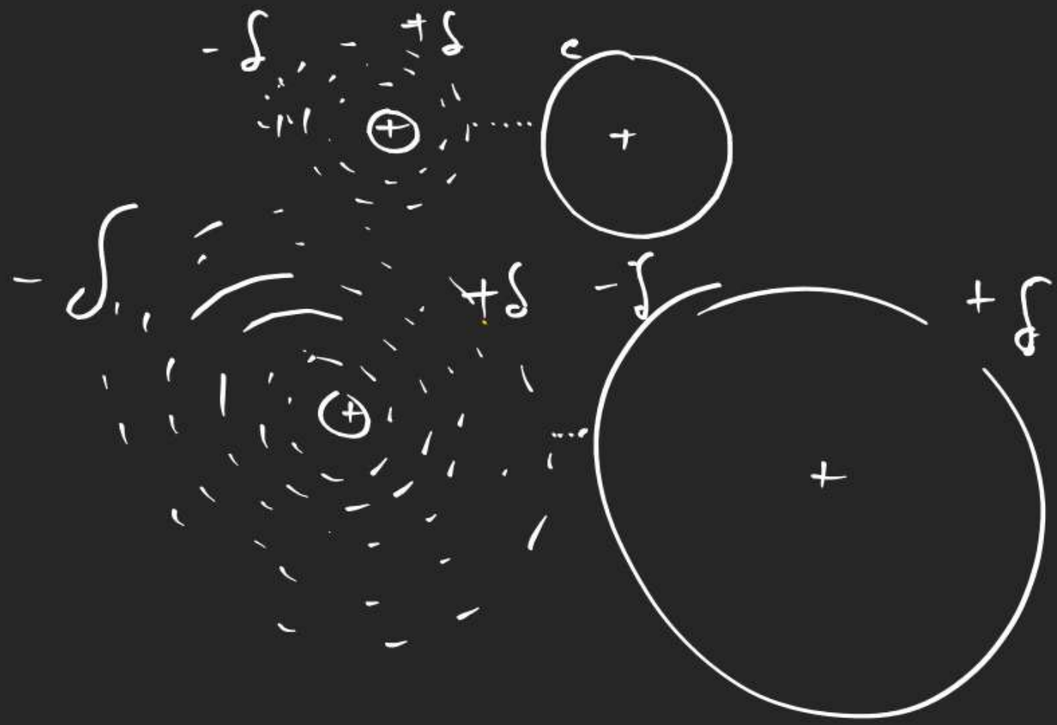
CHEMICAL BONDING

Note ⇒ When size of molecule is ↑ then L.D.F ↑



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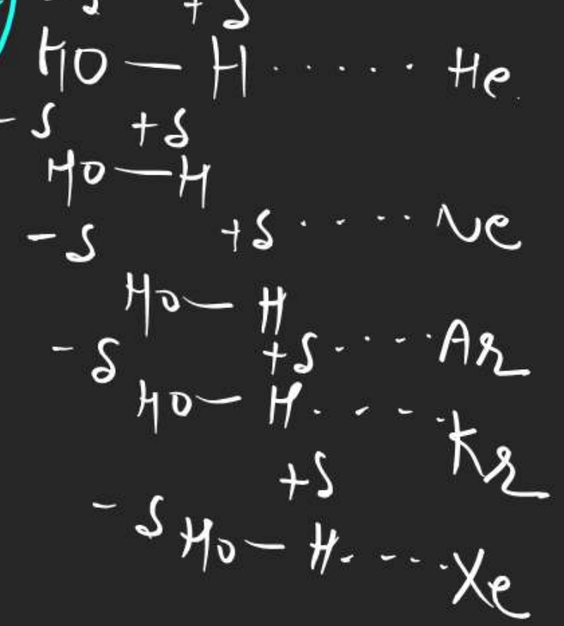
Que Which of the following interaction is responsible for Solubility of Noble gaseous?

(dipole-Induced dipole)



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CHEMICAL BONDING

one Solubility of Noble gas ↑ down the group (T/F)

(T)

When Size of Non polar molecule ↑ then dipole - Induced dipole Interaction ↑

Que Which of the following interaction is responsible for liquification / M.P / B.P of Noble gas

Ans ⇒ L.D.F

Note ⇒ M.P / B.P of Noble gas ↑ down the group.

He < Ne < Ar < Kr < Xe < Rn

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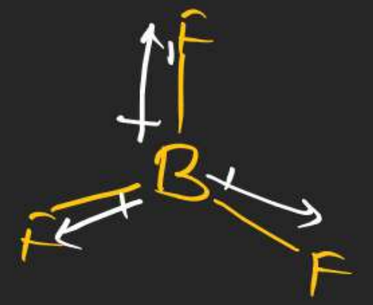
CHEMICAL BONDING

(gas) F_2
(gas) Cl_2
(liq.) Br_2
(solid) I_2
} L·D·F

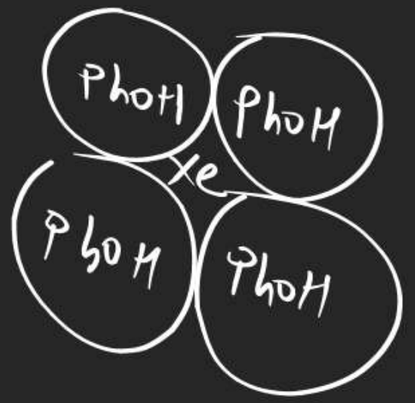
(gas BF_3
(gas) BCl_3
(liq.) BBr_3
(solid) BI_3
} L·D·F

down the group L·D·F ↑



$\mu = 0$
non polar

Ques/ Which of the following interaction is responsible for formation of Clathrate?



dipole - Induced dipole

Note ⇒ He and Ne donot form Clathrates due to their small size

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CHEMICAL BONDING

$Xe \cdot 6H_2O$ [Hydrates of Noble gas]

dipole - Induced dipole

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Instantaneous dipole - Induced dipole