BONDING

$F = \frac{kQ_1Q_2}{r^2}$

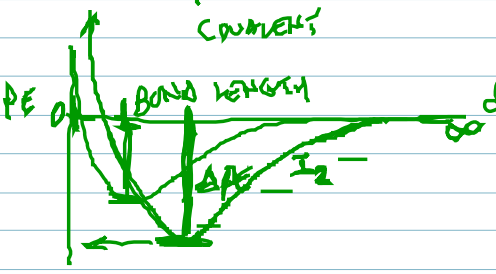
COVALENT | IONIC | METALLIC

"molecules" → CRYSTALLINE LATTICE

SOLIDS

"continuum"

pure covalent → POLAR COVALENT → "PURE" IONIC

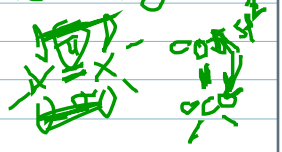


HYBRIDIZATION

sp^3 ⇒ TETRAHEDRAL ⇒ ~109.5° 4 σ

sp^2 ⇒ TRIGONAL PLANAR ⇒ 120°

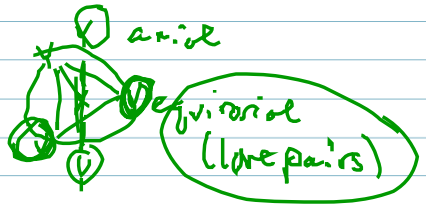
sp ⇒ LINEAR ⇒ 180° 2 π



VSEPR

5 total e⁻ pairs

trigonal bipyramidal

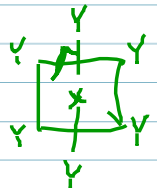


$X \equiv X$

$X=Y=X$

6 total e⁻ pairs

octahedral



BONDING

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⇓

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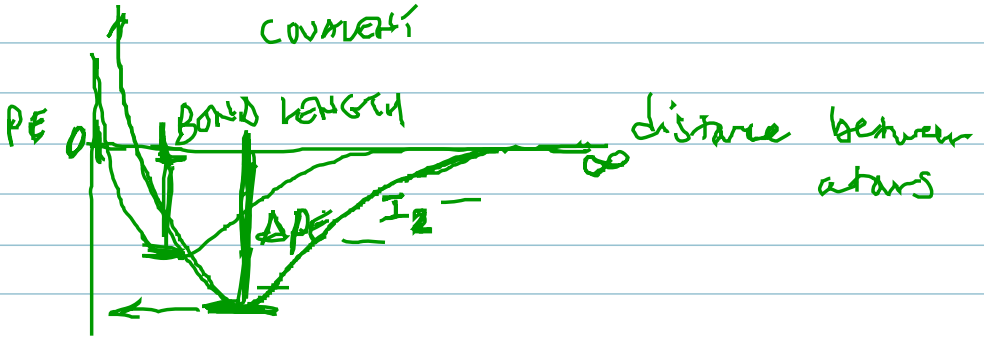
ΔEN



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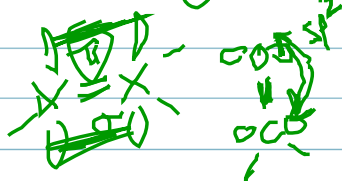

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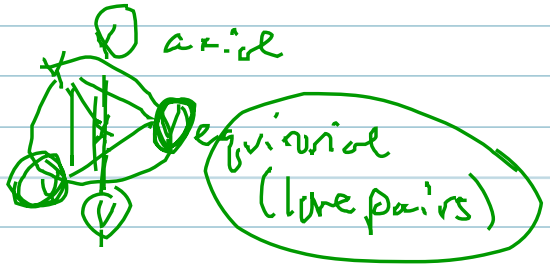

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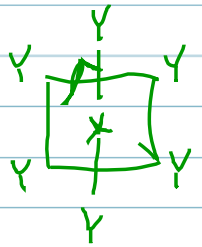


SOLIDS

ALLOYS → SUBSTITUTIONAL (14k gold) → phys props

INTERSTITIAL (STEEL) → *HARDER*

SEMI-CONDUCTORS

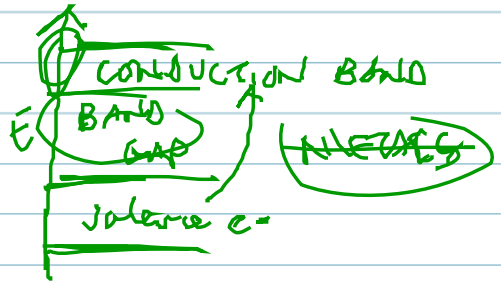
n-type "negative" more e⁻

p-type "positive" less e⁻

atom more valence e⁻ → fewer

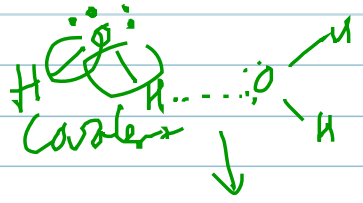
As 5 valence e⁻ → fewer e⁻ → "p type"

6 valence e⁻ → more e⁻ → "n type"



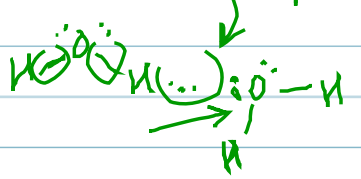
IMF's ≠ BONDS — coulombic attractions

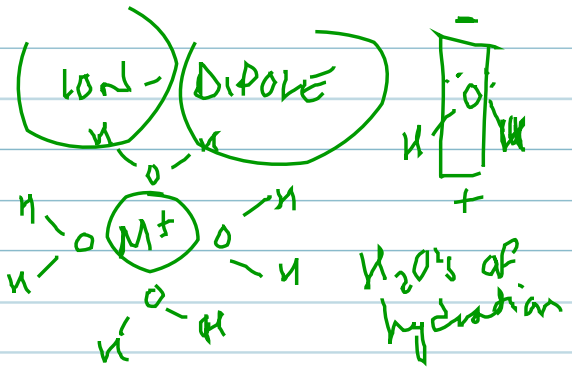
PRECISE LANGUAGE



↓ IN BETWEEN → H BOND

- LONDON (LDF's)
  (NONPOLAR ⟹ "polarizability" #e⁻'s ↑ (↑ e⁻ = ↑ polarizable)
- DIPOLE-DIPOLE (polar) DEN + GEO lone pairs POLAR asymmetric
- H-BONDING H⊂N, O, F





BONDS → chem props

IMF's → physical properties

MP's, BP's, viscosity, surface tension, capillary action ⇧ w/ ↑ IMF's

P_{vap} ↓ w/ ⇧ IMF

C_5H_{12} LDF's

H_2O H-bonding

SOLIDS → AMORPHOUS → no sharp MP, IMFs

BUTTER, ASPHALT, GLASS, PLASTICS

↓

CRYSTALLINE

BONDS → (I.) IONIC, (C.) COVALENT NETWORK

IMF's (MOLECULAR) ice

rocks

diamonds