	solid State	DATE
	TMEIL Wandarungalis at	thraction Forces + Gen (a)
	Till Yandecwaars a	actacion rotces
(aprill)	O London Forces or good su	12 Cana araa 1
1011	Dispersion Forces	
	@ pipole - Dipole x , cot	11 shu (0) + Dsu - (0)
(wall	p-smino ato beozene (ye	ationary) of 1 (Rotating)
K	A Modratord Carp of things - c	γ6
	@ Nigole - Toduced Disale	
1	3 Dipole - Induced Dipole o	
	O II pondina	76
	@ H-Bonding - D-D -	— N)
	V.C. v. T.C	6 H
	K-E × T-E	FJ
	TE X T	
	TM - VOYV chama a	
	IM - very strong 7 solid	3 IMF / Liquid state
	T.E - low J state	
	IMF - Yery weak & Graseou	
	T.E very high I state	
	000010111	
	Crystalline solids	Amorphous solids
	1) systematic geometric pat	tern O Random arrangement
	1 lang Range order	2 Short Range Order
	3 Smooth surface	3 Rough surface
	3 Sharp M.P	9 No starp M.P
	3 Definite Heat of Fusion	S No definite Heat of Fus
	© symmetry elements	No symmetry
	1 Anisotropic Nature	3 Isotropic nature.
		the second of the second of the second
1		
	classmate	PAGE

	DATE
-0	Molecular C.P. attraction Examples Physical Electrical M.P
1	solida ja ludajan - Forcesid a otal laid another I conduct
0	Non patar Landon H2 Cl2 Ar CD2 Soft Insulators
2	Polati = Molecules D-D Helinbrison soft side overy
3	H-bonded TP = Y = H=Bonding = +H=D= 1 Hardmonth 1 low
٥	(a) contration to the contration a precent
4	Ionic Ions Ionic Naci, csc Hardinswaters High
- (a-1)	solida = V=Bonid x KCI, MgO, Zns Brittle solid state
14 7 14	(Sappropries = 10, 10, 10 = 10, 10 = 10, 10 = 10, 10 = 10, 10 = 10, 10 = 10, 10 = 10
	alos polinetical alpha of the second of the
5	Metallic Metallic Cu, Ag, Au Hard conductors
	solids of in the sea bonding oft; Na, k < Malleable time fairly
	etc. Ductile High
	(Keenels) susarce - tertino oral < bordness
6	Covalent Atoms to Covalent Sic, AIN, Hard Insulators
	solidantare which the Bond - si020thouse which were
k9r	THE SOLF OF THE HIGH
	(Essergio out you) Td c (Graphite) - soft - conductor
Lagran Lagran	sp2 linear
	L= 3= d=1 (01) (01)
	Amorphous silicon — used as photovoltaic material
	- converts light -> electrical energy
7.1	4-7 (1-5 (94 (+15) (10)) (1-7)
E1 .	Poly czystalline solids -> overall amorphous - isotropic 0
APIC	single crystalline - anisotropic
132	1 1 1 1 2 1 2 2 1 2 1 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2
20 - C ·	Crystal lattice: 3D arrangement of C.P. (100/201)
X 25	2 1 1- lattice points / lattice sites borta vi (3)
£8.0.	
	all the properties of aystal is called unit can.
	classmate

	DATE
	Based on Dimension (Interfacial angles and edge lengths) are of unit cell are classified into 7 types -> crystal systems
- Constitution of the Cons	& 8 Man palme worden He de hr W. Svill , Iradiator
March Control of the	Cubic 1708 et a=b=c1 $\alpha=\beta=\lambda'=90$ 11 s FC BC
we 3	tetragonal: (1) $a=b\neq c$ with $x=B=y=90$. Is BC1-11
(3)	tetragonal: 11 $a=b\neq c$ $y = y = 90$. Is BCI-11 () Orthorhombic $a \neq b \neq c$ $x = \beta = y = 90$. S FC BC EC
deill @	Momodinicatil a #b # cl x= x= 90. B # 90. S ECHT
(5)	Triclinically Sat + p + con x + B + V + an estilla
<u> </u>	Hexagonal $a=b\neq c$ $x=B=90$, $y=120$, S
- no pro	Hexagonal $a=b=c$ $x=\beta=90$. $y=120$. s
+-	(C) Details Metaling Portallic Cu, Mg. Au Macd. & Conductors
T ylain	unit cell draws simple / Primitive - cp are present
dpill	Jetilend sta only corners
	centred - corners (A) (A)
	indulerat hand, illn, sis + Face centers mand incloved &
- Vuo.	Body centered - corners + Body centre
dgitt	> Edge centred - corners + atternate Face centres
	retoubact - Hot - (offder 1961) by (any two opp. Faces)
	8 - COYN ELS (-8C)
	12-edges (4c) $a=b=c=a$
	Faces (2c) (2c) (x = B = Y = 90 act of and -
	Sprain legistrops < - Juli 1997 - 1997
[location Zeff Pol CN DC VS
0	51111 ple 1021 - Micornets in 1108 X() = 1- 35:0 = 2 + 1116 - 15 - 10 - 10 - 10 - 10 - 10 - 10 - 10
2	Face centred corners + 8×1/8+ 0=2/2+ 10 =111
	(FCC/CCP) Fuce centives 116 XII/2 = 410 18 10 76
3	Rody courses the 8x 1/8, this fig = 1, x = 00.1
dain	(BCC) and del Body centres in 1 = 2000 to 1/2 to 1/2 to 1/2
	suttle properties of constal is called Unit all.
	alacessat a
	PAGE

	DATE DATE				
01	Density! d= zeff x M n home Molar mass				
E. F.	a3 X NA NA - Avagadro number				
	(9) Midline the charge higher will be 0.10				
•	Close packing in oxystals: 179 purelle out of the offer of				
	र्मार्गाता स्थान				
0	110 - C·NO-2 @ 2D - O square closepacking				
-	tineatzero> til cino-4 tollanaty +				
	THE 2000 2010 (HCP)				
13					
kos	From Hcp in 2D 23 0 - 111'0				
	-O HCP - ABABAB O PCC/CCP - ABCABCING GO O				
	TV - CN-4 Cubic close packaging				
	000-) CN-1613 2015 @ arrangement! 110 = 18 DM				
120	each unity cell has				
	In HCP unit cell to = + on No. of Voids in a unit cell 1)				
	zeff = 161 lim time tons 0.V = zeff 0 = tru 0M0				
	PF = 74% Still 2017 P TV = 2 x Zeff 15 04 0				
9	VF = 26% 1907 Total voids = 3 x zeff = +				
	C·N = 12 = 2-2 O'l'In FCC @2In HCP				
Į k	$T \cdot V = 8$ $T \cdot V = 12$				
	7.V = 8 $7.V = 12$ $0.V = 6$ $0.V = 6$				
	each Body Diagonal Total = 12 Total = 18= 10				
	has 27V = V31a = +00				
	1 at Body centre (6 Face centres)				
17.	1) and the that done + 3 at edge centre +				
	Imicrorystals: 110 - 3100 chang'y Pace centres)				
	C.b = 100 \$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				
Page 1	C.N of c= no. of anions surrounding = 10 100				
* 1	C.N of A = no. of cations surrounding				
AND I	P D				
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	DATE			
0	If the charges of ctiand A - are same then c. No are also			
	same and all x of			
2	Higher the charge higher will be C.No.			
3	The Ratio of C. No always equal to the inverse ratio of			
	their numbers			
1	prince and excupation and competry			
	7+ ivalues - Radius - <0.155 11002 linear			
(45H) pa	13 TJEON LONDPOXS ROCTIO 0.155 - 0.225 3 TGP			
	1A3A (wirt c+) 0.225 - 0.414 4 Tetrahedral			
	0.414-0.732 (1.61) 1. Octahedral			
0	Rock salt (1Nac1) - 750 / 51 (0.732 - 0:999 - 8511 BCC -			
1	CO F = 4 vent video F -110 - VT			
2.7	Nate = all oys = 4 mills (2) zinc Blende (zns)			
1	each unit cell has $5^{2-} = FCC = 4$			
	4 Naci formula units , 11 czn2+ = atternate itys = 410 .			
V	c.NO Nat = 6 These = Vivi each unit cell has= High			
	C.NO CI = +6: x = VT 4 Zns Unita = 77			
	4+ + 18 = x a = shlow hader C. No Zn2+ = 40 = 14			
	1011 (112()) 507 CEND (S-2 = 41 = M.)			
-	21 = V + V = 3 = V = V = 12			
3	CSC 3 = 4.0 P = 4.0			
	CIT = 8 simple cube = 1 = 9 + Alumite (caits) to a door			
	$CS^{T} = cat Body centre = 1$ $con +2 = FCC = 4$			
(antro)	$F^- = all TVS = 8$			
+ 31	each uniticell has 1 10 2 reach whit cell has 4			
(cerrines)	Coll formula units.			
	C.N of Cs+ = 8			
	Cin of CC = 8 colors come and con of the time			
	1+ + 1 = 1/3 ugame surjus (x+++ 1 = 1/3 la)			
	2			
	classmate			

	DATE DATE
9	Anti Huorite (Na20) . Imperfections / defects
127	02 = FCC = 4 - 111-1 in solids:
3.1	Na+ = all TVS = 8 Deviation From Ideal
-	each unit cell has 4Na20 molecules it arrangement.
	c·No of Na+ = 4 benetain Defects
	$C \cdot N0 \cdot \sigma_{1} \cdot 02^{-2} = 8$
1.7	$Y^{+} + Y^{-} = \sqrt{3} \alpha$ Devigande Pointanne miline
30	Defects Defects
· mi	Letern paracy O : stoloh sintemologite my .
•	Point — O stiochiometric — Formula does not change.
The Lo	Defects without Defects possibility Potentitype
A second	@ Impurity — si 1 2+ p-type
Yellow	rect - Vellout Trob-
	stide : 3 Non-stiochemetric — Formula will change
	Defects
•	vacancy defect - Density decreases. The pay of the part of
	Interstitial defect - Density increases.
	Desing in 11 it districte in detervite ettes W -: site ne soft 1
	Imic solids (stiochiometric defects)
50(1)20	n of sub ischottky per a di istorpo gi Frenkel: situagambia 💿
<u></u>	same no. of c+ and A- of the Generally c+ missing its
	emos esignosompris mitisoposition in in induccupies same
_	maintain electrical neutrality aminterstitial voids in a
- c	density decreases and so brain-maintain electrical neutrality
型 -	Ionic crystals having - No change in density
	High C.N. In- Jonic crystals having low CN.
16.7 -	In which c+ and A- pu- at is much smaller than A-
	having almost same - Interstitial defect.
	size.
<u> </u>	Vacancy defect.
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=	=					
+		Impurity defects:	P-type - si Al	icum that of		
T		Sycl2 r	-type - Si P	= " (2		
	lt.	Nacl 2 2Nat	8 = EVT 146	= 1511		
	1	electrical neutrality	adesive and worth	TO THE STATE OF		
		should be maintained				
		each 52+ ion make 1 secress				
		costion vacancy on doping Nacl				
	2 fr	risd streng _ and	Anion	extra		
	•	Non stiochiometric defects: —	— O Vacancy	metal im		
	-Op	the roll of the second of the	montholis by			
	(5)	FeD+ Fe+2 Fe+3	atolici Schottky	Frenkel		
	7	Fe0+ Fe+2 Fe+3	thum defect	defect		
,		Fe 0.94 0	Nacı-Yellow	zno - Yellau		
	apa	Ni 0.96 Oumicy sintained	odio-kci- ülac	white		
100		1 5ty	of of F-centre			
	•	Magnetic properties:				
			eneg - toefen in			
	0	Paramagnetic :- Weakly attracted	ed in magnetic field	unpaired ee		
		are present.	introduction) st	3 177 1 1		
	2	Diamagnetic: - Weakly repelled	l in magnetic field	due to absence		
	37	mpared es	s. Alar to be	Trans - B		
	3	ferro-magnetic - Fe, Co, Ni,	Gid and CrD2 . 1	TITE		
	(Anti - Ferromagnetic - Mno	file tura la man. 11.	TULT.		
1		V	11 V	11 V 11		
1	Birth	the missistant air tair-unpaired	eg present But d	iamaanetta		
-	⑤	Ferri - magnetic - Festy	eg present But d	iamaanetic		
	.MD QU	Ferti-magnetic - Feaux	og present But d	iamaanetic		
Charles - Const.	.MD QU	Ferri-magnetic - Feaux- I pain I dictem Mg Fe 204 I allow Change Chan Zn Fe 204	og present But d	iamagnetic - Yer sout -		
Challenge distribution of the cytic control of	.MD QU	Ferti-magnetic - Feaux	og present But d	iamagnetic - Yer burst - MO NO 4		
Contributed Prefer themselves Adjustments of the contributed and present	.MD QU	Ferri-magnetic - Feaux- I pain I dictem Mg Fe 204 I allow Change Chan Zn Fe 204	eg present But d	iamagnetic - Yer burst - MO NO 4		
	.MD QU	Ferri-magnetic - Feaux- I pain I dictem Mg Fe 204 I allow Change Chan Zn Fe 204	eg present But d	iamagnetic-		

- Andrew

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