	VIT, Vellore lampy PHY 1701 (Engineering Physics). Leb Manual and Records. Pate: 1st April 2021 Reg: 20BD\$0405
	Date
}	Electron Diffraction - Page
	Apparatus Regioned of circulate and discountry
1.	
2.	High voltage power supply lupts 10 KV).
3,	Connecting wires.
4.	Plastic measuring scale.
	The property of the second sec
	OBJECTIVE:
	To calculate the interplanar spacing in graphite from the
	diffraction pattern.
	\mathcal{M}
	BASK INFORMATION: 4 CHARLES THE THE
_	In this exposiment, electrons get transmitted through a very thin
	polycrystalline graphite sheet. The schematic sketch is shown
<u></u>	in fig 1. Graphite has two independent lattice spacings (d) and
×	deland these are shown in Fig. 2 The two diffraction rings
`-	that will be seen at each voltage, are due to these planes.
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	Applying the diffraction formula for first order, we get.
5 -1	- Sino
1	inhore a is the de-Broglie wavelength of et dis interplanar
_	spacing and & is the angle of diffraction. Electrons are accelerated
	spacing and 8 is the angle of diffraction. Electrons are accelerated through a p.d. of V volks and home their de-Briglie Wavelength
	96 : .
	7= 12.3 B A
	From the geometry of Fig. 1 we have,
	$SINO = R$ $VP^2 + L^2$
	NK-FT

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	upon simplifying and using the fixed value of L= 13.5cm and
	P is expressed incm,
	$\sin \theta = \frac{1}{\left(1 + \left(\frac{135}{2}\right)^2\right)^{0.5}}$
,	the state of the party opening of
	Interplanar spacing can be calculated from equation (1)
	by substituting equations (2) and (4) into it.
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1 11	
И _{+ - 2} 1, 1	SAFETY GUIDELINES AND PRECAUTIONS:
1 . 1.	Never accelerate beyond 5KV
2.	Never touch any controls on the power supply other
1. 413.	than the on-off switch and voltage varying knob.
3.	Mever use force to measure the ring diameters. Keepa
1. 10 m	plastic scale very gently over the tube to measure
	the diameters. Metal scales are not allowed.
4.	You are working with a very high energy source (55KV)
	and hence touching any part of the entire setup of the
, c, 272/-05	than what is mentioned in point 3 (just for the purposes)
1.157.5	measurement) is prohibited. This is for the purpose of
-977 of	your bion casety and the casety of the Lab.
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	Proxedure:
1	Set the accelerating voltage at 4 KV.
2	For the inner ring, measure the diameter (2Pi).
ુ	
4	For the outer ring, measure the diameter (2R2).
5	
6.	Calculate: 2, 5100 and of from the equations (2), (4) and
	(1) respectively and fill up the corresponding call in the
	tabular column.
7.	
8	alculate the average d' for both inner and outer hings.

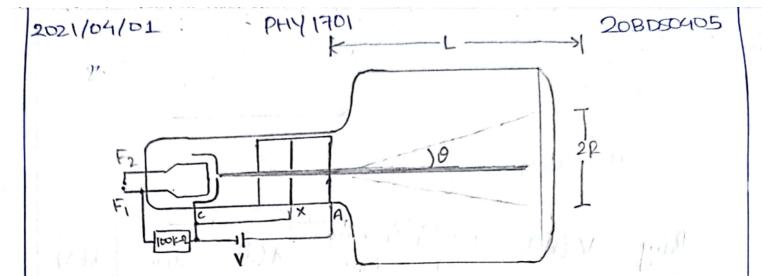


Fig: - Schematic diagram of experimental setup.

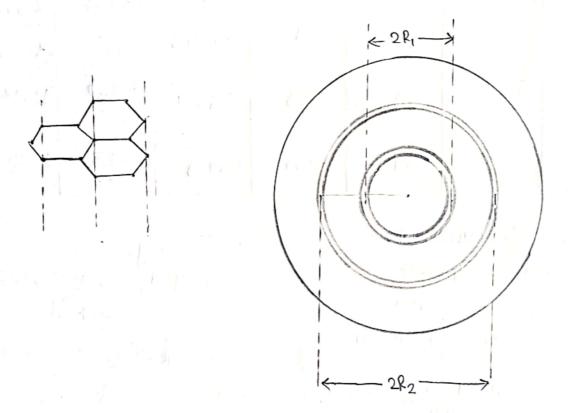


Fig: left (Two independent types of lattice planes in polycrystalline.

Tabilar Column:

Ring	V (KN)	2kg or 2kg	for fz	λ(B).	sire	1(A)
	40	24	3.2	0.1945	0-0882	2-138
Donas	4.5	2.2	1.1	0.1834	0.0815	2.259
	5-0	2.0	1.00	0.1739	0.0739	2-353
1 1	4.0	4-2	2-1	0.1345	0.1537	1-265
Cuter	4.5	3.9	1-95	0-1834	0.1430	¥28 2
	5-0	37	1.85	0·1339	0.1858	1-280

SAMPLE CALCULATION:For Inner radii, V=4.0 kV $2R_1=2.4 \text{ cm}$ $R_1=\frac{2.4}{2}=\frac{1.2 \text{ cm}}{2}$

For ordering,

Averaged = 2.198+2.259+2.353

= 2.27 A

For innurring,

Averaged = 1.265+1.282+1.280

 $\lambda = \frac{12.3}{VV} = \frac{12.3}{V4000} = 0.045 = 0$

= 1.276 A

 $\sin\theta = \frac{1}{\left(1 + \left(\frac{13.5}{2}\right)^2\right)^{0.5}} = \frac{1}{\left(1 + \left(\frac{13.5}{1.2}\right)^2\right)^{0.5}} = 0.0885$

d= 2 sin0 = 0.1945 R = 2.198A

Similarly, inner diameter and order ones were calculated and conserved by mean that the interplanar spacing are $d_1 = 2.029 \, \mathring{A}$ $d_2 = 1.276 \, \mathring{A}$

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	RESULT:-	- Chrombord 1
	The Interplanar spacings in gr	ighte were
	measured as di= 0.227 nm ar	d d2 = 0-1276 hm.
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