Carbon^{14} $_6C^{14}$ β-decaying without γ half life $> 10^3$ years

E_0 in MeV 0.145 in Mc^2 units 1.28.

C_{14}. Discovery 1945 p.5.

Heidenreich <u>222</u> reflu in diamond

Phys.l theory of ferromagnetic Domains

Rev. Mod. Physics <u>21</u> 541 (1949)

Structure of graphite Nature <u>164</u> 1088 (1949)

J App Phys. 20 #11 1158 (1949)

1 part by vol. carmine ground with 5 parts of flowers of sulphur, + then mixed with 3 parts of lycopodium powder dyed blue [by adding 70 gms of l powder to 100 cc of 2% soln of methyl violet in alcohol + allowing it to dry in air]

\+ attracts red portion of powder

\+ – to " blue " "

to read

Scattering of slow neutrons.

Ruderman Phys Rev. 76 1572 (1949)

Resistivity of Graphite

Phys. Rev. 76 1878 (1949)

71 622 (1947)

Change in work fn of Si

Phys Rev. 76 1882 (1949)

Ilmenite Structure

Phys. Rev. 76 1886 (1949)

Opt. props of film of BeO [illegible]

Phys Rev. 76 1887 (1949)

Chem. & Eng. news 27 1933 (1949)

fine particle measurement.

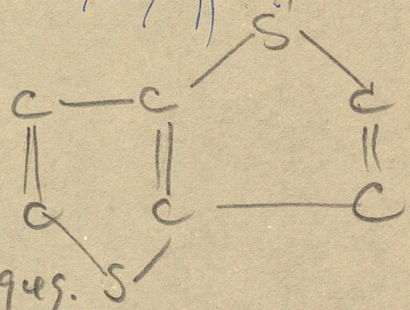
Diamagnetic anisotropy contd

5. Dimethylhydroxy-pyrimidine dihydrate. — Plane structure.

for (2) to (5) see

Act. Cryst. 1 168 1948
2 145 1949.

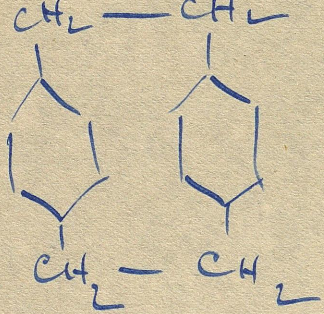
6) Thiophthen



Act. Cryst. 2 356, 1949.

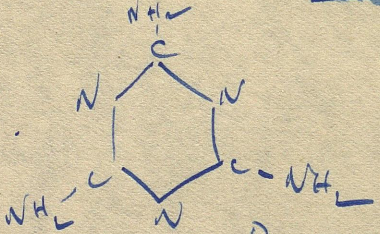
Diamagnetic anisotropy

1.

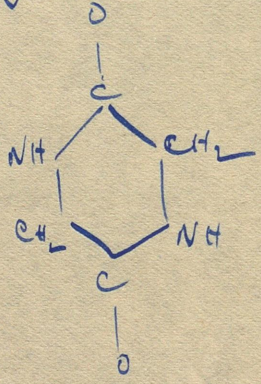


di-p-xylylene Nat. **164** 915 (1949)

2. Melamine.



3. diketopiperazine



4 Cyanuric triazide.

5. pyrimidine Ad- Cyt-

Paramagnetic

~~Co~~ $Co[Hg(CNS)_4]$.

Nat. <u>159</u> 610 (1947) ~~Pitt~~.
by J.W. Jeffrey. The full paper must
have been published. Look up.

Rajagopal

Structure of oxalic acid dihydrate crystal: whether any photodissociation occurs in solid state (& nature of dissociation)

Booth Proc. Roy Soc. A 190 490 (1947)

pr refers to earlier papers too.

Winchell Part I p. 77-80. μ of crystals

1. Powder immersed in liquids: on microscope stage

Each fragment thinner near the edges: Hence acts as a lens.

If $\mu >$ liquid convergent:

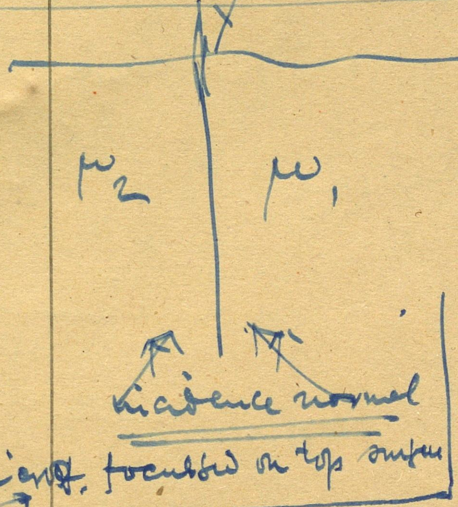
$\therefore$ focusses $\parallel^l$ light above stage.

A raising of objective of microscope from focus on specimen makes central portion brighter

Lowering shows bright line of light outside the fragment.

With $\mu < \mu$ liquid reverse

2)

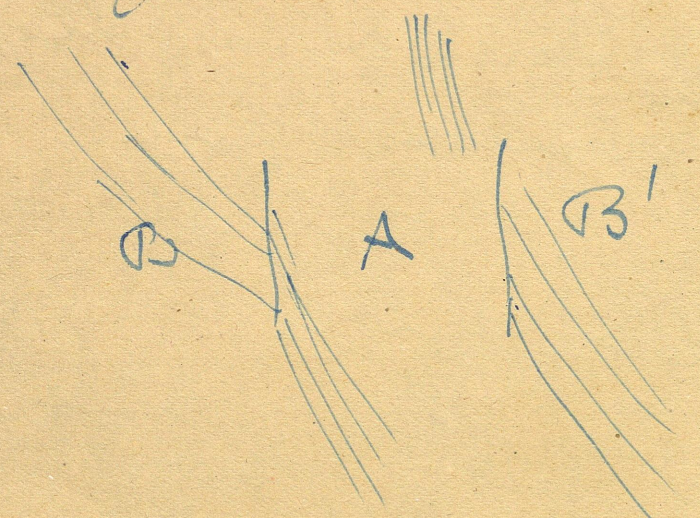


If separation of the two media $\mu_1 > \mu_2$ vertical plane then μ_1 side brighter $\because$ of total reflection & also transmission from other side. As focus lowered line of light narrows, brightens & moves towards ~~centre~~ partition plane. Further lowering of focus makes bright line (Becke line) move to other side of partition

$\therefore$ when focus raised ~~the~~ B line moves toward side of higher μ. & toward lower μ if focus lowered.

medium or higher power objective used & ~~focussed~~ accurately on line of contact then lower the condenser enough to darken the field notably, (or partly close diaphragm)

3) oblique illum



~~ob~~. Both μ_B + $\mu_{B'} > \mu_A$.

Where the edge appears bright the higher μ is ~~fr~~ on the side from which light comes.

700

4 ~~tt~~ Usually dispersion of liquid > of ~~the~~ solid.

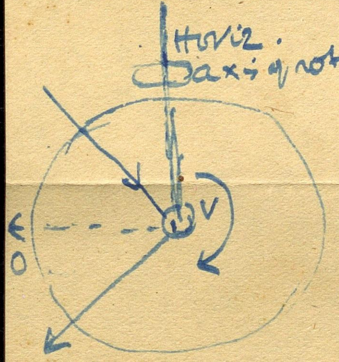
∴ In oblique illumination when μ of liquid + solid same for some intermediate part of spectrum

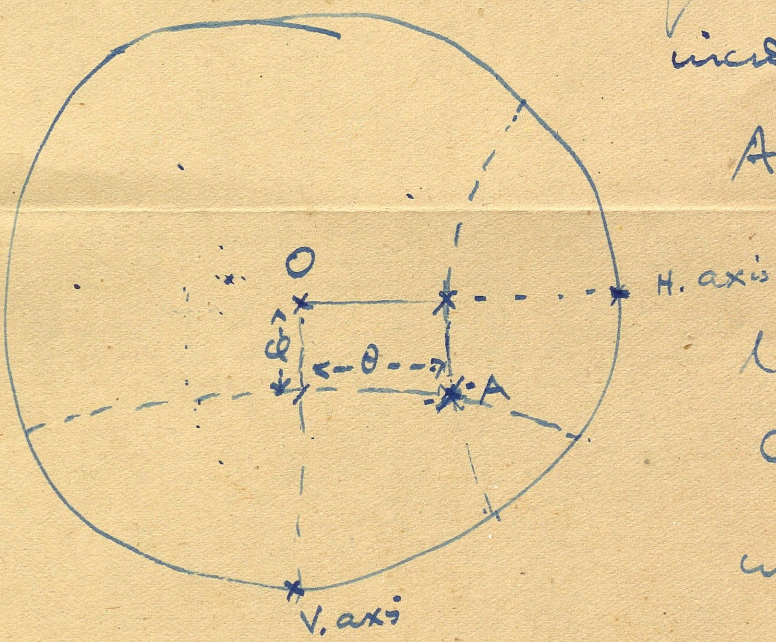
B' = B > A for blue

B' = B < A for red

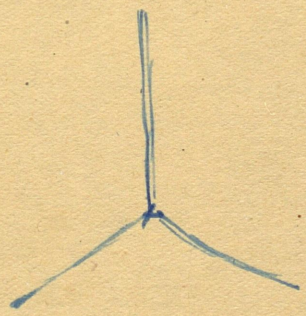
∴ Rt edge of A will appear blue
left red.

Suppose in a 2 ⊙le theodolite goniometer the direction of the collimator & the telescope are fixed, and the reflections ~~φ~~ from the different faces brought into the ~~≠~~ centre of field of view by suitable rotations θ, φ of the crystal about the vert. & horiz. axes of the goniometer, the horiz axis being at 90° to the bisector O of the directions of incidence & refln.





Any face A can be brought to coincidence with O, i.e. to a position suitable for reflection, ~~then~~ by rotating thro θ & φ.



Analyse one crystal: on the 2 ⊙le goniometer.

~~Let a be the amplitude + a^2 the intensity~~

Let S be the scattering coeff^t of an atom in the crystal per unit solid $\angle^{le}$.

and Σ ~~vs will be the do.~~ the scattering coeff^t of the crystal ~~per~~ also per unit solid $\angle^{le}$.

Let $N = \nu V$ be the total no. of atoms in the ~~elementary vol. v of the~~ crystal of small vol. V.

Then for ideal regular fixed arrangement of the atoms in the lattice

Σ the ~~intensities of the~~ scattering coeff^t corresponding to directions of Bragg reflections

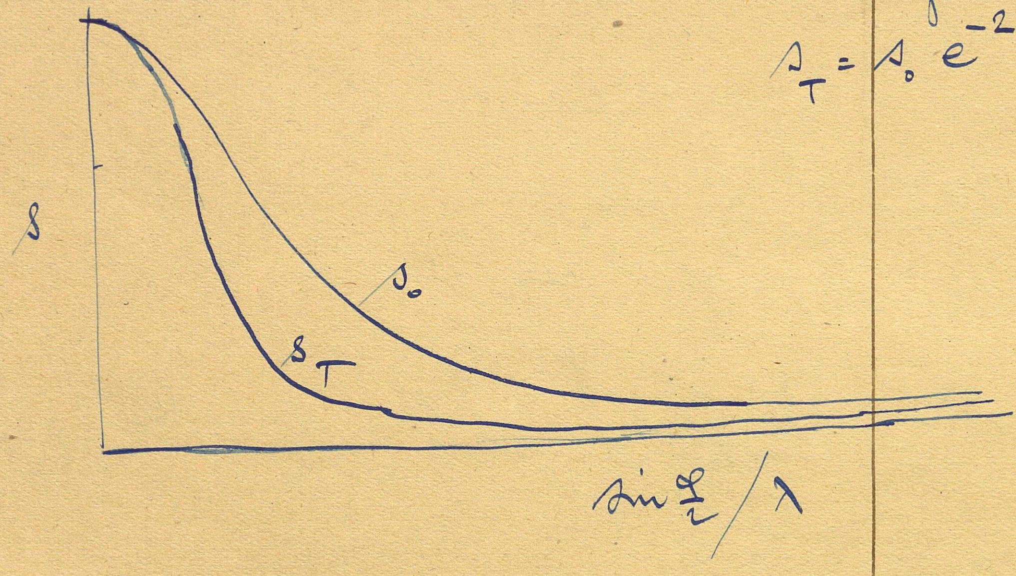
$$= (N\sqrt{S})^2 = N^2 S.$$

Due to ~~thermal~~ the usual defects in the crystal, the intensities at the Bragg reflns will be less — ~~thus~~ though the ~~inte~~ integrated intensity over a finite ~~∠le~~ angle of scattering about the Bragg angle will be the same as for the ideal crystal.

Owing to the finite size of the distribution of electrons about the nucleus S will be a fn of $\frac{\sin\frac{\theta}{2}}{\lambda}$ falling off with increase of the latter.

~~Let the a~~ Considering now the effect of thermal agitation, and taking it to a rough approximation to be equivalent to a spherically symmetrical swelling up of the electronic cloud round the atom, the only effect will be to make s_T different from s_0

$$s_T = s_0 e^{-2M}$$



$$\cancel{S = \nu^2 KT\beta \cdot \sigma}$$

$$\cancel{R = \nu KT\beta}$$

$$\cancel{R = e^{-2M}_{hi}\ \nu KT\ F_{hmn}\ \frac{1}{C_{11}}}$$

$$E = c_{11} - c_{12} - 2c_{44}$$

$$E = 0 \quad c_{11} = c_{12} + 2c_{44}$$

when $c_{44} = 0$ $\quad c_{11} = c_{12}$

per unit vol of crystal, per unit solid ∠

$\sigma = \nu s_0 \times R$, where $R = e^{-2M}\nu KT F$.

Now for the long waves that we are considering s_0 will be practically indep^t of φ, and may be taken to be a const.

$$\therefore S = \underbrace{\nu^2 KT \times e^{-2M} \times s_0}_{K} \times F$$

and for a given temp. $= KF$.

For any given direcn. of incidence say 100, the total intensity of scattering over all directions

Let S be the scattering coefficient per unit volume of the crystal per unit solid $\angle^{le}$; S will vary with the directn of incidence & of scattering, & on other factors & will be given by

$S = R s_0$ where R is the structure factor of the crystal
s_0 is the atom form factor

both for the same directn of incid & of observation as define S.

$R = e^{-2M} \times \nu R T\ F$.

∴ ~~S~~ Considering very long incident waves for which $\sin\frac{\theta}{2}/\lambda$ is small [even for backward scattering for which it is $1/\lambda$]

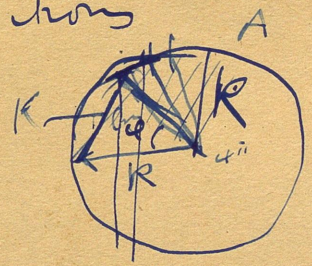
e^{-2M} is practically unity

and s_0 is practically independent of ~~θ~~ the $\angle^{le}$ of scattering

and any given temp.

$S = \nu^2 R T A_0 \times F = K F$.

The total scattering in all directions



$\cancel{= \int S \times 2\pi \sin\theta \cdot d\theta}$

$\cancel{= 2\pi K \int F \sin\theta}$

$\int \frac{S \times dA}{\cancel{4\pi}} = \cancel{\frac{K}{4\pi}}$ $= \int^{4\pi} S \cdot d\omega$

$= \int S\, dA$

where A is the element of area on a sphere of unit rad.

$$= K \int F\, dA = \frac{K}{c_{11}} \times \int f\, dA = \frac{K}{c_{11}} \times I, \text{ say}$$

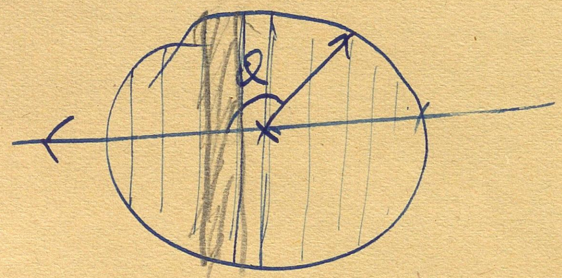
~~Now~~ where $f = \dfrac{a + b\Sigma l^2m^2 + c\,\Pi l^2}{a' + b'\Sigma\ '' \quad + c'\ ''}$

where a, b, c have the same notation as in the notes.

Reqd to find I.

Now taking incidence along $[100]$

values of f have been calculated for elements of area dA obtained in the following manner



Sphere divided into ~~20~~ 10 equal zones by planes $\perp^r$ to $[100]$, and at equal distances 0.2.

Each zone divided into

The integration over all the elements of area in each such zone can be done directly.

$\because$ f can be put in the form $\dfrac{A + B \sin^2 2\eta}{A' + B' \sin^2 2\eta}$

where A's + B's are fns of ϕ alone.

$\int f\, dA$ over one of the zones.

$$= Y \times \frac{1}{5}$$

where Y can be calculated.

$\therefore$ Now $I = \sum_{n=1}^{n=10} \dfrac{Y}{5}$

0 6.0 –

50 p.p.m. Th.

Back ... 11.0 – 12.0

Fe Th

·12.0

Fe Th

50 · 6.0 8.0 ·

7.8

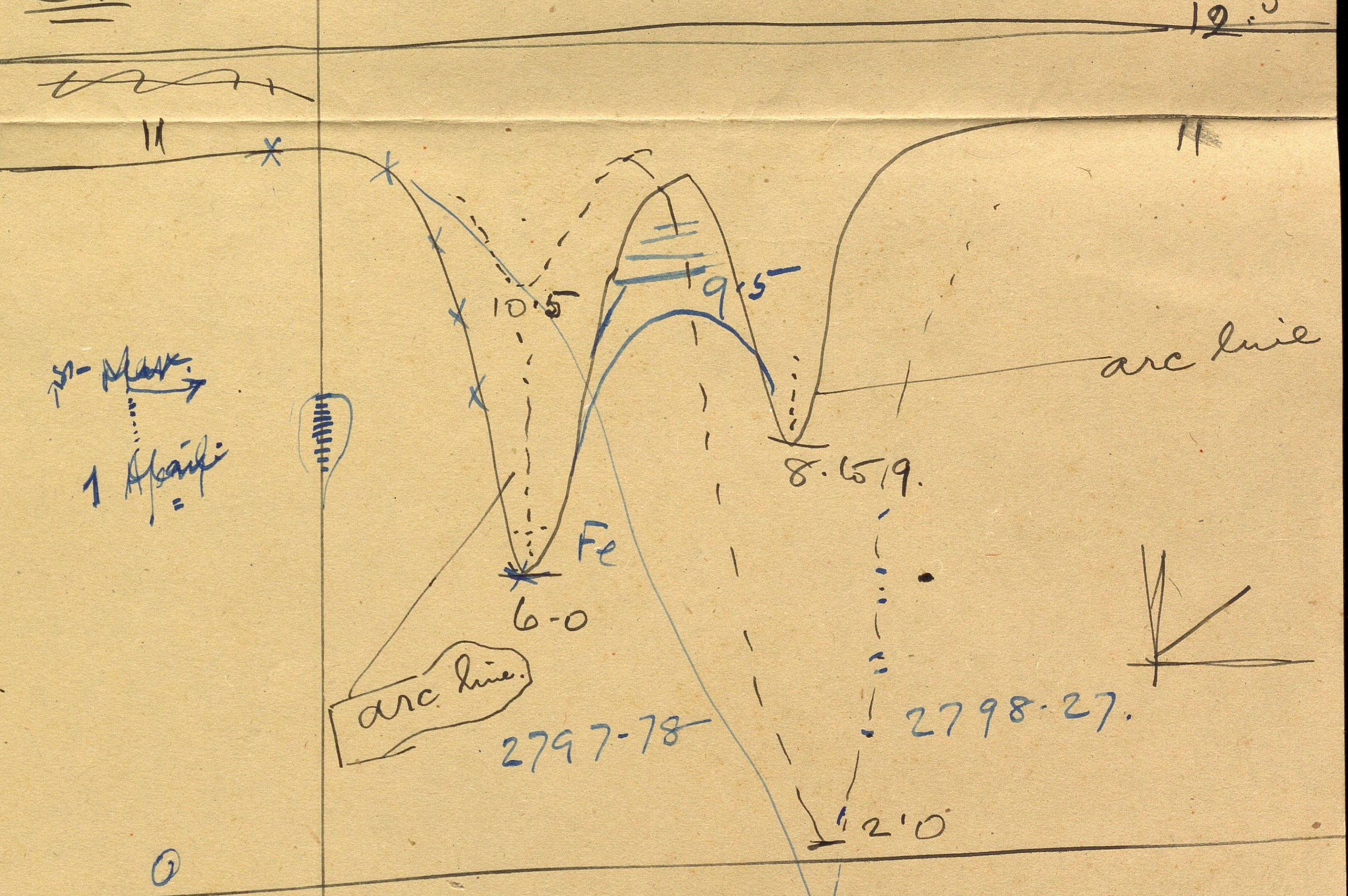
100

1000.

1 in 1000

3%

50 parts.



O