cellulose. The double cellulose pattern found in coir admits at any rate of two interpretations.

The photographs, obtained after chlorination and other treatments, support the view that lignin is amorphous. The lesser intensity of the photographs may, however, have significance.

The results obtained from the wood of oak differ from those shown by the model of *Pinus* presented by Freudenberg, which, however, admits of a different interpretation, but they are probably consistent with those of Schmidt for ash and fir, and also would appear to support Pienkowski's statements (loc. cit.) concerning compact woods.

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[1] K. Freudenberg, *Der Papier Fabrikant*, **30**, 189; 1932.
[2] B. Schmidt, *Z. Phys.*, **71**, 696; 1931.
[3] S. Pienkowski, *Z. Phys.*, **63**, 610; 1930.

Registration of the Ionisation Curve of a Single α-Particle

IF an α-particle from a preparation *A* (Fig. 1) passes through a hole in the electrode *B*, it produces ions in the space between *B* and *C*. The ions drift with constant velocity in the homogeneous electric

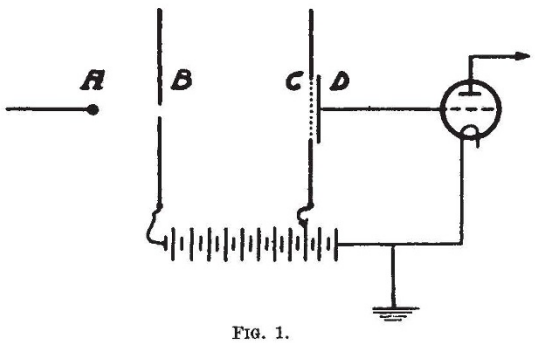

FIG. 1.

field between the electrodes. When the ion column has reached *C*, it passes through the meshes in the grid and produces a current $i(t)$ to the electrode *D*, which is connected to a four-valve amplifier. This current $i(t)$ would be expected to give a good picture

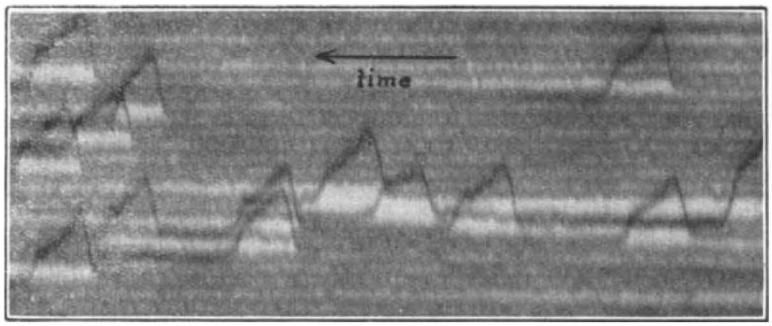

FIG. 2.

of the ionisation curve. But as *D* has a capacity and is well insulated, the tension to be amplified is proportional to $\int_0^t i(t)\,dt$. Therefore, in order to obtain the ionisation curve after the amplification, we must differentiate the tension curve, and this is done electrically between the third and the fourth valve by the help of a resistance-capacity device having a very short time-constant.

The amplifier is connected to an oscillograph and the light-sensitive film or paper is placed on a rotating cylinder. The zero position is moved during the revolutions.

Fig. 2 shows an oscillogram obtained in this way. The α-particles which have depicted their ionisation curves in it, came from a very weak polonium preparation placed 2 cm. from *B*, so that the ionisation curves represent the last 2 cm. of their path.

It seems quite possible to register H-particles in the same way. Then, if the oscillogram is calibrated, it tells us at once the kind of the particle (height of the ionisation curve) and the length of its track (proportional to the length of the ionisation curve). Therefore, if the ionisation chamber is given a geometrical form adapted for very weak preparations, this instrument may be useful for the study of nuclear reactions.

A more detailed report will appear shortly.

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Properties of Crystalline Magnesium Oxide

ARTIFICIALLY produced crystals of magnesium oxide (MgO) are now available commercially; since they are formed as a by-product in a commercial process, they are not expensive. Our samples were obtained from the Norton Company, Worcester, Mass., U.S.A. Most of the pieces of crystal are about 1 cm. × 1 cm. × 0·5 cm., but a few larger specimens up to 3 cm. × 3 cm. × 1 cm. are produced. Some specimens are quite clear, some are slightly yellow, and some are a little cloudy. The clear specimens are transparent to λ 2200. The crystal belongs to the cubic system, but most specimens show some double refraction owing to residual strains.

Brice and Strong[1] found the crystals to be resistant to attack by lithium, sodium, potassium and calcium. We have made quantitative tests by heating the crystal with various metals in small evacuated tubes; the tubes were kept at the specified temperatures for 1 hour. Potassium (400° C.), sodium (500° C.), lead (1,050° C.), magnesium (1,100° C.), and aluminium (1,100° C.) had no effect; calcium (1,050° C.) and copper (1,100° C.) etched the surface slightly. Thus the crystal is much more resistant than glass or quartz to penetration by metal vapours. X-ray analysis shows[2] that the crystal has a close-packed structure, which probably accounts for this property.

The material can be ground and polished by using successively graded emery, tin oxide and rouge. Windows can be sealed into soda glass of high expansion coefficient. (The coefficient for the crystal is 11×10^{-6}; our glass—determined by Messrs. Yates and Roulston—has a coefficient of $9{\cdot}6 \times 10^{-6}$ in the range 0°–100° C.) The glass appears to wet the crystal when molten, and adheres well when cold, forming a vacuum-tight seal. It is important that the edges of the crystal should be polished before