

*nature* of the ions from experiments of this character. A specimen of pure aluminium phosphate has been prepared which shows a very small ionization in comparison with either ordinarily pure aluminium phosphate or with the salts of the alkali and alkaline earth metals at the same temperature.

With some salts under certain conditions the decay of the positive ionization depends on the electrical field employed as well as on the time. A similar effect has already been shown by the author to characterize the positive ionization emitted by "new" platinum wires.

There is some indication that the action of vapors emitted by the salts on the hot platinum present in the apparatus is an important factor in the emission.

#### TORSIONAL ROTATORY POLARIZATION.<sup>1</sup>

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EXPERIMENTS which have been reported upon previously,<sup>2</sup> demonstrated that torsional rotatory polarization is a joint effect of the twist and the accompanying transverse distortion. The latter produces double refraction and the former rotates the axes of this double refraction into an helical configuration. The theory of the phenomena has been worked out and the relation between the total difference of phase due to this double refraction (irrespective of the helical arrangement), the total angle of twist, and the rotation, may be expressed graphically. If a segment of a circle be constructed of aperture equal to twice the total twist, and whose arc is equal to the total difference of phase (in radians), the area of the segment is numerically twice the rotation (in radians).

It is difficult to measure the relative distortion of a twisted cylinder, and therefore cylinders were formed with an initial helical structure. The section was rectangular (to obtain simple strains), and when they were compressed at each point perpendicular to two of the opposite sides, they resembled optically and mechanically a twisted cylinder. For each such helical cylinder was prepared a similar straight cylinder which was compressed an equal amount. The difference of phase in the latter and the rotatory polarization of the former were observed. The observed rotations always agreed, within the limits of experimental error, with the rotation calculated by introducing the observed difference of phase and the angle of twist into the above graphical construction.

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<sup>2</sup> Am. Jo. of Science, VIII., 1899, p. 89; XV., 1903, p. 363; Phys. Zeit. I., 1899, p. 201; V., 1903, p. 706; Johns Hopkins Univ. Cir., 1900, p. 64; PHYS. REV., XXXI., 1910, p. 607.