ON THE WAVE-LENGTH OF THE RADIATION GIVEN
OFF IN AN ALTERNATING CONDENSER FIELD.

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IN a previous paper by the present writer¹ some measurements were given of the wave-length of the radiation from aluminum, silver, copper and zinc when these metals are joined to the cathode of the secondary of an induction coil or are placed in the field of an air condenser the plates of which are joined to the terminals of an induction coil. Since that time, similar measurements have been made for other metals and for some non-metallic substances. These measurements have been made by means of the grating used in the former experiments, viz., a celluloid replica of a Rowland plane grating having 14,438 lines to the inch.

In all cases here mentioned the radiating substance, the grating and the photographic plate were enclosed in a dark box which was placed between the glass plates upon which the tinfoil condenser sheets were pasted. The radiation was allowed to pass through a slit in a vulcanite screen and through the grating and fall upon the photographic plate. On account of the feeble intensity of the radiation, the slit and grating were placed only from four to five centimeters from the plate, and the distance of the first spectrum from the central image of the slit was only from eight to ten millimeters. Naturally this distance could not be measured with a high percentage of accuracy, but the plates were all re-measured by Miss Shirley Hyatt, a student in the laboratory, and the two measurements seldom differed by more than two or three per cent.

In general, the radiation from each metal seemed very homogeneous. Only in the case of platinum was the spectrum appreciably wider than the central image of the slit. The metals tested and the wave-lengths determined for their radiations are given below.

¹ PHYSICAL REVIEW, XVIII., 366, May, 1904.

Metal.	$\lambda\mu\mu.$	Metal.	$\lambda\mu\mu$
Cadmium,	335	Nickel,	360 (?)
Tin,	340	Iron,	369
Bismuth,	346	Copper,	372
Antimony,	351	Zinc,	380
Magnesium,	348 (?)	Manganese,	380
Aluminum,	350	Lead,	380
Silver,	350	Platinum,	380-400
Gold,	350	Tinfoil,	329

The measurements made on magnesium and nickel were less satisfactory than the others, the photographs of the spectra being less clear. In platinum the width of the diffracted image indicated that the radiation was less homogeneous than in the case of the other metals. Apparently some of this radiation extended to the extreme violet of the visible spectrum. Carbon disulphide was, however, apparently quite opaque to the platinum radiation, indicating that the greater part of the radiation was of wave-length not much greater than 380.

A number of crystals of various salts were tried as radiators by sticking a crystal with glue on a piece of cardboard which was placed upright in the dark box in front of the slit. It was found that in this position the cardboard gave off no appreciable radiation. Of the crystals tried, all gave off the radiation except sodium chloride and nickel sulphate. These gave no appreciable radiation after exposures of from 17 to 25 minutes while from 5 to 10 minutes was generally long enough to give a plain image of the slit. It is interesting to notice in this connection that sodium chloride is one of the salts found by Schmidt¹ not to be actinoelectric. Nickel sulphate is not given in his list.

The following substances gave off radiation of wave-length approximately as given below :

Substance.	$\lambda\mu\mu.$	Substance.	$\lambda\mu\mu.$
Silver nitrate,	334	Potassic bromide,	370
Ferrous sulphate,	weak (?)	Potassic ferrocyanide,	334
Copper sulphate,	363	Cinnabar,	359
Lead nitrate,	348	Sulphur,	(?)

¹ G. C. Schmidt, Wied. Ann., 64, 708-724.

In the case of radiation from crystals even more than from metals it was found that sharp points or edges were the principal sources of the radiation. Photographs of crystals made by means of their own radiations and by the use of a quartz lens showed only a number of point or line sources of the radiation.

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