

Colour Reactions of Urine

A SAMPLE of urine containing about 2 per cent of free sulphuric acid and treated with certain oxidizing agents, as for example, potassium dichromate, potassium permanganate, ammonium persulphate, iodine or iron sesquichloride respectively (the latter two at a high temperature), produces a reddish pigment which may be destroyed even by a slight excess of those reagents. A chromogen of urine which is responsible for this colour reaction is derived probably from some nutrient material, for urine of carnivora (lion and wolf) develops only a brownish colour, while that of man and pig is an intense wine-red, and urine of herbivora (cow, horse and sheep), fed on a plant material containing photoxan¹, gives a rose-red pigment².

This colour reaction may be very helpful in physiological investigations of metabolism, and also for certain diagnostic purposes.

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¹ Kozłowski, *Acta Soc. Bot. Pol.*, **15**, 1 (1938).

² Kozłowski, *Acta Soc. Bot. Pol.*, **15**, 227 (1938).

Dioxyaleic Acid Oxidase

In a previous paper¹, two of us reported on the existence of a vegetable dioxyaleic acid oxidase. We wish to correct our statement that this enzyme is not sensitive to cyanide. The function of this catalyst, prepared from sorrel (*Rumex acetosa* L.) by acetone precipitation of the juice of the leaves, is inhibited completely by 0.0001 M hydrogen cyanide at pH 4, where the enzyme has a sharp optimum. Comparative studies suggest that this ferment is one of the three basic aerobic oxidases of the vegetable kingdom, the other two being the polyphenol and ascorbic oxidase. The enzyme oxidizes the acid reversibly, the H being oxidized to H₂O₂.

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¹ *Z. physiol. Chem.*, **255**, 57 (1938).

Artificial Production of Uranium Y from Thorium

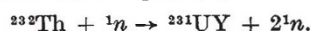
ARTIFICIAL radioactivity induced in thorium by neutron bombardment has been studied by various authors¹. Meitner, Strassmann and Hahn² especially have recently published the results of their detailed investigations, according to which they ascertained the production of a thorium isotope ²³³Th (26 min.) and three isomers of a radium isotope ²²⁹Ra (< 1 min., 15 min. and about 4 hours).

We have also been studying the same problem for some time, and so far as the above results are concerned, we seem to be in general agreement with the last-mentioned authors. Besides these isotopes, moreover, we obtained another thorium isotope which we identified with uranium Y, the parent substance of protactinium, the thorium series thus being changed over to the actinium series.

Thorium nitrate, carefully freed from mesothorium as well as from other disintegration products except

radiothorium, was exposed to fast neutrons which were produced by bombarding lithium with 3 Mv. deuterons obtained by means of our cyclotron. After the exposure, which ranged from three to fifteen hours, thorium was chemically separated from the sample. This showed two periods of β-decay, one of which we identified with that of ²³³Th as above mentioned.

The other period of 24.5 hours was surmised to be due to a thorium isotope which was produced from thorium through loss of neutrons. This ought to give uranium Y according to the following reaction:



In fact the above period coincides with that of uranium Y (24.6 hours) in accordance with our supposition.

The sign of the β-rays was shown to be negative and the measurements of their absorption in aluminium gave an absorption coefficient of 246 per cm., which is not very far from 300 per cm. found by Antonoff, and lies between 52.95 and 585 per cm, given for two components by Erchova³. All these facts support the above conclusion. The detailed account of the experiments will be published elsewhere.

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¹ Fermi, E., Amaldi, E., D'Agostino, O., Rasetti, F., Segré, E., *Proc. Roy. Soc.*, **A**, **146**, 483 (1934); Hahn, O., and Meitner, L., *Naturwiss.*, **23**, 320 (1935); Amaldi, E., D'Agostino, O., Fermi, E., Pontecorvo, B., Rasetti, F., Segré, E., *Proc. Roy. Soc.*, **A**, **149**, 522 (1935); Curie, I., v. Halban, H., and Preiswerk, P., *C.R.*, **200**, 1841, 2079 (1935); *J. Phys. et Rad.*, **7**, 361 (1935); Rona, E., and Neuninger, E., *Naturwiss.*, **24**, 491 (1936); *Mitteil. Inst. Radiumforschung*, No. 384, 479 (1936).

² Meitner, L., Strassmann, F., and Hahn, O., *Z. Phys.*, **109**, 538 (1938).

³ Erchova, *J. Phys.*, **8**, 501 (1937).

Magnetic Properties of Superconductors

Using a ballistic method, we have measured the magnetization curve of the superconducting alloy Au₂Bi; for a specimen built up of separate small crystals we obtained the curve in Fig. 1. It will be seen that there is practically no 'tail' to the curve, and that the hysteresis is much less marked than for a typical superconducting alloy; in fact, the magnetic behaviour approximates to that of an 'ideal' superconductor. Such hysteresis as there is, is probably due to very slight impurities in the specimen, rather than to the irregular shape, since a similar specimen made up of small irregular lumps of very pure tin (an 'ideal' superconductor) showed much less hysteresis.

Since Au₂Bi is an alloy of definite composition (it is not soluble in either gold or bismuth¹), this resemblance to the behaviour of an 'ideal' superconductor confirms the view that the anomalous