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AN INSTRUMENT FOR THE RESOLUTION
OF THE COMPONENTS OF THE DOUBLET K_{α_1}, α_2 ON X-RAY
DIFFRACTION PHOTOGRAPHS

(Abstract of preceding paper)

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The author describes a simple analogical instrument for the resolution of the components K_{α_1}, α_2 on photometric records of X-ray diffraction photographs. In the majority of practical cases these components partly overlap; the degree of overlapping depends on geometric and physical factors. Sometimes the influence of the physical factors cannot be limited even by suitable choice of the geometrical arrangement so that overlapping is often unavoidable. If we carry out measurement in which both components must be resolved, we can either eliminate the component K_{α_1} by monochromatization of the radiation or resolve the two components graphically on the photometric record. The second method is simpler and the assumptions ([1], [2], [3], [4], [5]) on which it is based are usually satisfied with sufficient accuracy. If we denote the intensity of the line K_{α_2} by $\varphi(x)$ and the photometric curve of the doublet K_{α_1}, α_2 by $f(x)$, expression (2) holds for $\varphi(x)$ (see [1], [4]) in which k denotes the ratio of the integral intensities of the lines K_{α_2} and K_{α_1} in the spectrum and a is the interval of resolution of the two components (Fig. 1). The desired curve $\varphi(x)$ according to Eq. (2) can be constructed by the instrument. The basic scheme is shown in Fig. 2. The contacts on the potentiometric cylinders $R_{24}, R_{23}, R_{22}, R_{21}$ are firmly fixed to the needles of moving rods which can be adjusted directly to the various points of the curve $f(x)$. The changes in sum of the resistances $R_{24} + R_{23} + R_{22} + R_{21}$ (knobs 1—4 in Fig. 3) when running over the various points of the curve are balanced by the contact on resistor R_{41} (knob 5 in Fig. 3), also firmly connected to a rod and needle by which the point of the curve $\varphi(x)$ can be recorded directly. The photometric record is laid (Fig. 4) on a table between two pairs of cylinders by which it can be shifted. The instrument can add the first four terms of the series (2) in one position of switch 8 (Fig. 3) and the second four terms of the series in the second position of this switch. The other terms can always be neglected with a small error. The source is a battery of 6 V and the indicator is a galvanometer of sensitivity $2 \cdot 10^{-7}$ A/mm. The balancing of the bridge in this arrangement is sufficiently fast since it is only balanced to 1—2 mm from zero. The maximum height of the curves which can be resolved by the instrument is 120 mm. The instrument simplifies work in resolving curves, speeds it up and practically eliminates sources of personal errors. A small adjustment of the instruments would be necessary to replace the manual balancing by an automatic one.

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