s5.m1.o5 The new electron diffraction method for investigation of crystals with low symmetry. M.G. Kyazumov. *Institute of Physics of Azerbaijan Academy of Sciences, H.Javid av 33, Baku 370143, e-mail: physic@ lan.ab.az*

Keywords: high voltage electron diffraction, thin films, layer crystals.

It is worked out the new electron diffraction method as result of the rotation (during the exposure) of crystals with low symmetry around axis, c, which is perpendicular to plane, *hKO* , beforehand tilted from perpendicular position to incident electron beam at angle, $\varphi(\varphi < \beta^*)$. For crystals with monoclinic lattice this method represents a oblique sections (relatively to axis, c) of the opposite cones formed by rotation of knot rows, *hO.* (l is changed), around axis, c, and hyperboloids of one sheet formed by rotation of knot rows, *hK* (*hK*-constant, *K≠0*, l is changed) around axis, c, too. There are topes of cones and centres of hyperboloids on the axis of rotation at distance, $ha^* tg\beta^* = tg\beta^* \cdot R_{h00}/\lambda L$, from centre of reciprocal lattice. Asymptotes of hyperboloids are lines, $z^* = y^* tg\beta^* \pm ha^* tg\beta^*$, in reciprocal space. Where z is directed along axis, c, of atomic lattice and with axis, z^*, forms the angle, $(\beta - 90^\circ)$. The section of cones, *hO*, by Evald's plane are ellipses displaced along big axis by turns in opposite sides. The little $(R^I)$and big (R^{II}) semiaxes of ellipses and the displacements of centres of ellipses (Δl) along big axis's are calculated by formulae:

$$R^I_{hO} = R_{hoo} tg\beta^* / (tg^2\beta^* - tg^2\varphi)^{1/2}$$
$$R^{II}_{hO} = R_{hoo} tg^2\beta^* / \cos\varphi (tg^2\beta^* - tg^2\varphi)$$
$$\Delta l_{hO} = R_{hoo} tg\varphi tg\beta^* / \cos\varphi (tg^2\beta^* - tg^2\varphi)$$

The trajectories of ellipses are calculated by formula:

$$X^2 / (R^I)^2 + (Y + \Delta l)^2 / (R^{II})^2 = 1$$

where X, Y-coordinate of points in two-dimensions coordinate system.

The sections of hyperboloids are ellipses too. But parameters of ellipse, (R^I), (R^{II}) and Δl, are determined others formulae:

$$R^I_{hK} = \left[R^2_{OKO} + R^2_{hOO} tg^2\beta^* / (tg^2\beta^* - tg^2\varphi)\right]^{1/2}$$
$$R^{II}_{hK} = R^I_{hK}\, tg\beta^* / \cos\varphi (tg^2\beta^* - tg^2\varphi)^{1/2}$$
$$\Delta l = \frac{R_{hOO} tg\varphi tg\beta^*}{\cos\varphi (tg^2\beta^* - tg^2\varphi)}$$

It is clear that $\Delta l_{hO} = \Delta l_{hK}$

In particular, for *OK* hyperboloids $R_{hoo}=0$, therefore parameters of the ellipses are the following: $\Delta l=0$, $R^I_{OK} = R_{OKO}$ and $R^{II}_{OKO} = R_{OKO}\, tg\beta^* / \cos\varphi (tg^2\beta^* - tg^2\varphi)^{1/2}$

The advantage of this method over others electron diffraction methods are the following:

1. On the electron diffraction pattern there are layer lines;
2. Every ellipse containing in itself overlain with each other several series of reflections is disjoined to two or four ellipses which contain only separate series of reflections.

Besides, all advantage of before elaborated by us "Rotation around normal to plane of film forming with electron ray oblique angle" method take place.

The calculation of the electron diffraction patterns are made by well-known formulae for oblique texture.

Notes