Poster

New rotation electron-diffraction methods and their applications

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By tilting and rotating a thin single-crystal film (TSCF) in various ways (TSCF lies exactly on the plane of the crystal holder), we obtain an electron diffraction pattern of the type of lamellar oblique textures (Fig. 1a) and acicular textures (Fig. 1b) [1]. From the reflections h00 we determine the value of the parameter *a* of the crystal lattice, and from the reflections 10*l* the value of the parameter *c*. By the distribution of reflections 11*l*, we determine the thickness of the package (layer, structural unit), and by the value of the second strong reflection (in this case, 116) in this series, we establish the structural type [2].

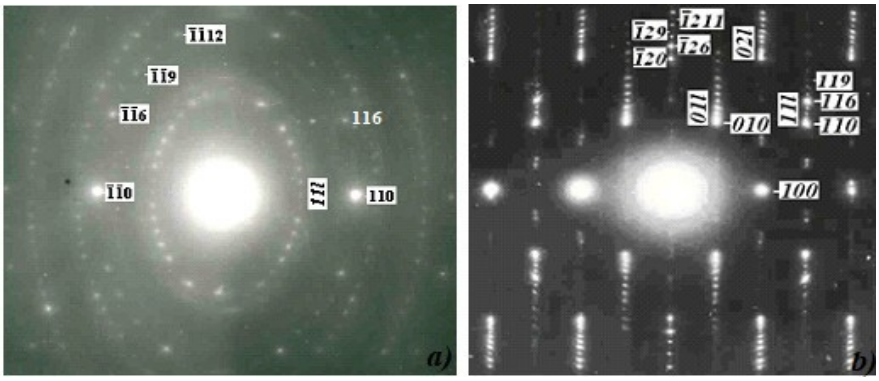

Figure 1. Electron diffraction patterns of the $CdInGaS_4$ TSCF imitating electron diffraction patterns of a) lamellar and b) of acicular textures.

For some reason, the TSCF does not lie on the plane of the crystal holder (**CH**), and we are unable to correct it. In such cases, after tilting the CD and rotating around an axis perpendicular to the CD plane, in the electron diffraction pattern some reflections shift from the line of ellipses. We give diagrams explaining such rotation and helping to easy processing of the obtained electron diffraction patterns (Fig. 2) [3].

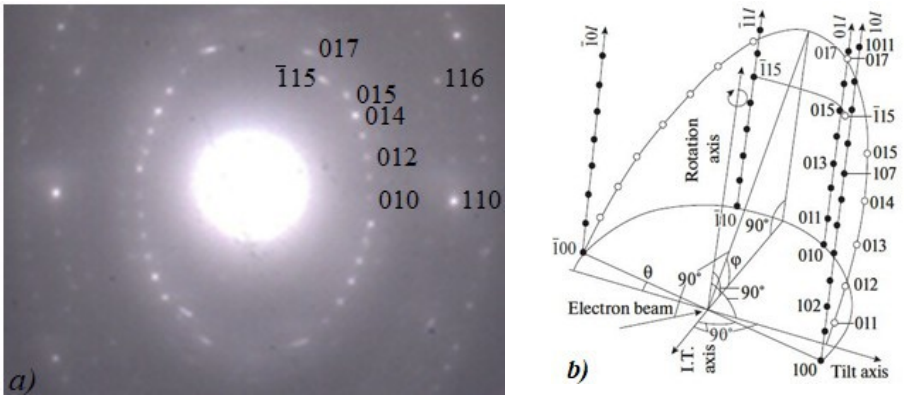

Figure 2. a) rotation electron diffraction pattern of 2H-polytype of $Mg_{0.7}Ga_{1.4}In_{0.8}S_4$ (φ = 35˚, ω = 60˚) single crystal films and b) scheme of rotation and detection of sites of the reciprocal lattice in the Ewald plane. Closed circles show reciprocal lattice sites located parallel to the 00 *l* axis, open circles correspond to the 01*l* and -11l sites detected in the Ewald sphere cross section, I.T. is the axis of the initial tilt of the film relative to the plane of the crystal holder, and θ is the angle between the film and crystal holder planes.

[1] Kyazumov, M. G. (2014) *Crystallography Reports.* **59**, 486.

[2] Kyazumov, M. G. (2014) *Crystallography Reports.* **59**, 705.

[3] Kyazumov, M. G., Rzayeva, S. M., Avilov, A. S. (2022) *Crystallography Reports*. **67**, 833.