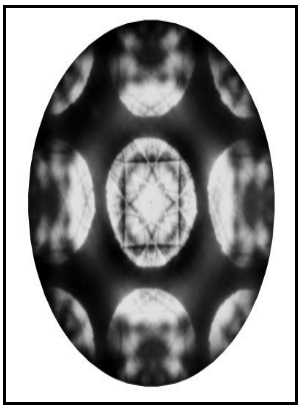
Large-angle convergent-beam electron diffraction (LACBED) - applications to crystal defects

Société Française des Microscopies - Large



Description: -
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Angola -- Social life and customs.
Diffraction.
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Electrons -- Diffraction.Large-angle convergent-beam electron diffraction (LACBED) - applications to crystal defects
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University casebook series
Monograph of the French Society of MicroscopiesLarge-angle convergent-beam electron diffraction (LACBED) - applications to crystal defects
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Tags: #CBED #and #LACBED: #characterization #of #antiphase #boundaries

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An entire chapter is concerned with instrumentation. It is shown how the LACBED technique in particular can be used to derive the magnitude and sign of the Burgers vectors of dislocations and displacements at stacking faults.

CBED and LACBED: characterization of antiphase boundaries

This enables layer strains to be measured to approximately 0. This splitting can be considered as typical and used to identify APBs.

CBED and LACBED: characterization of antiphase boundaries

The advantages and the disadvantages of the LACBED method are discussed in comparison with the corresponding CBED method and with a recent method based on the analysis of bend contours. It indicates that the superlattice excess lines present on these patterns are split into two lines with equal intensity when the incident beam is located on an APB. The coexistence of the Bragg-line pattern and the of shadow image of the defect in correct rotational relationship to each other makes the analysis straightforward and free from possible sources of errors.

CBED and LACBED: characterization of antiphase boundaries

Finally, the advantages and disadvantages of both methods for the characterization of antiphase boundaries are discussed. The book ends with a long chapter in which numerous applications concerned with the characterization of crystal defects are examined and analyzed. .

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Among the advantages of these methods with respect to the conventional transmission electron microscopy methods, are that one or few patterns are required for a full analysis and the interpretations are easy and unambiguous. In this book, the author goes well beyond a simple presentation of the method.

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For bicrystals and multilayers examined in plan-view, LACBED gives the rocking curve for a chosen reflection.

CBED and LACBED: characterization of antiphase boundaries

In the case of antiphase boundary the superlattice excess line is split into two lines with equal intensity on bright and dark field LACBED pattern. In the present paper, we describe the CBED and LACBED characterization of another type of crystal defect showing a special interest in materials science: antiphase boundaries APBs. This paper explains how the convergent beam electron diffraction CBED and large angle convergent beam LACBED techniques can be used to study crystal defects, bicrystals, and multilayers.

CBED and LACBED characterization of crystal defects

Convergent-beam diffraction is capable of furnishing remarkably accurate crystallographic information. The first part of the paper is devoted to the determination of the effects of antiphase boundaries on CBED and LACBED patterns that could be expected from a theoretical point of view. The large-angle convergent beam electron diffraction LACBED technique is used for determining the crystal polarity of GaP and GaAs single crystals from cross-sectional samples.

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