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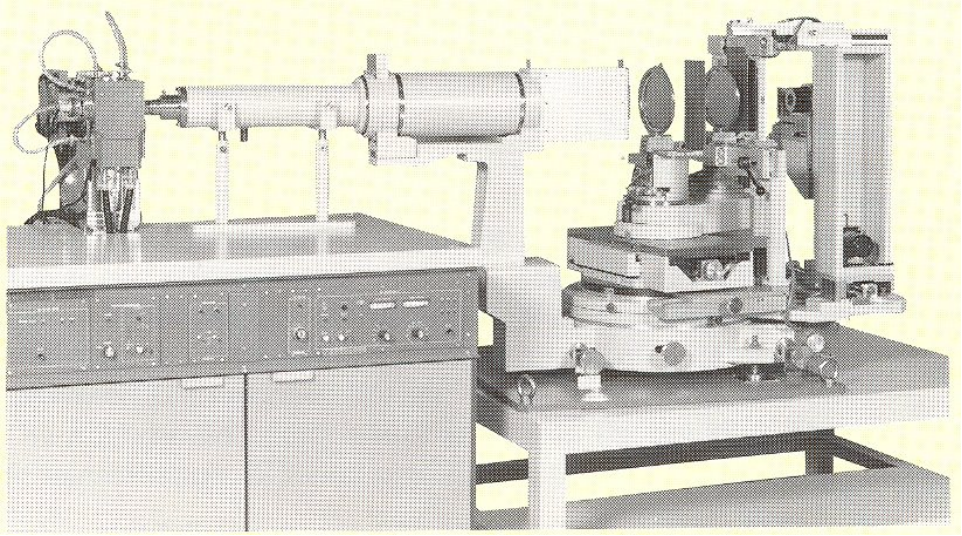
Product Information

SCANNING TYPE DOUBLE CRYSTAL TOPOGRAPHIC GONIOMETER MODEL 2



1. Introduction

The scanning type double crystal topographic goniometer Model 2 features the capability of both transmission and reflection topography, compared with the existing model designed exclusively for the reflection method. Other features include an improved motor-driven remote-control function and enhanced safety in operation.

The 1st crystal section is fixed onto a scanning stage, while the 2nd crystal section is configured on a rotary base which is coaxial with the 1st crystal rotation axis (ω_1) This makes it possible to employ the reflection arrangement (in the Bragg case) as well as the transmission arrangement (in the case Laue), as illustrated in Fig. 1 (a), (b). Moreover, for the rotation of the 2nd crystal, a motor-driven coarse rotation mechanism by worm & wormwheel is provided besides the bar system fine rotation mechanism to facilitate the 2nd crystal arrangement.

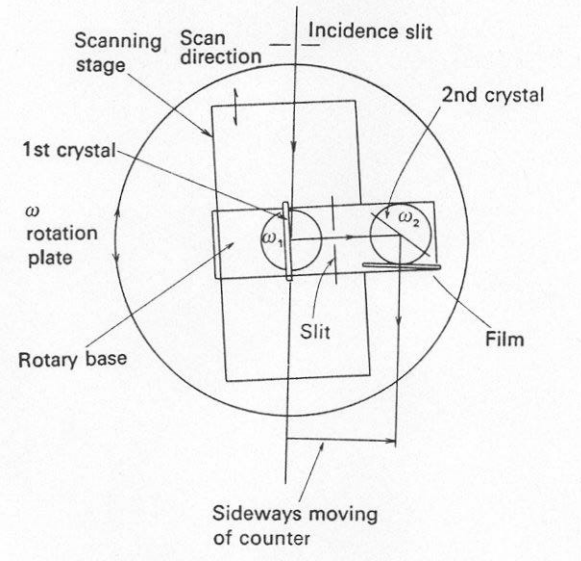
Both the 1st crystal and 2nd crystal (specimen) are mounted on the same scanning stage and are scanned. This makes it possible to obtain a large area double crystal topograph with ease without affecting the angular relation between the two crystals.

This goniometer is designed to be mounted on the right side of the RU-200 or RU-300 rotating anode X-ray generator.

In addition, the Model 2 can also function as the conventional Lang camera (single crystal method) and as such, it may suitably be designated a "universal topographic goniometer".

2. Configuration

(1) Goniometer main body
(2) Controller
(3) Stand and radiation enclosure
(4) Oil rotary pump for vacuum path
(5) Scintillation counter and electronic circuit panel (counting and recording)
(6) X-ray EYE with CCD vision camera



With CuKα, the arrangement can be made over the range of Si(400)~(440) (2θ=69°-106°).
Rocking curve measurement is also possible.
The 1st crystal can be scanned in a direction parallel to the 1st crystal surface by utilizing asymmetrical reflection.

Fig. 1 (a). Double crystal method of (+, -) parallel arrangement: Bragg case

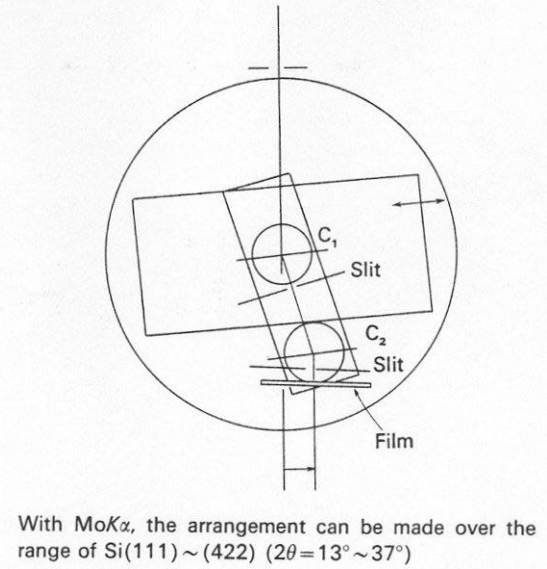


Fig. 1 (b). (+, -) parallel arrangement: Laue case

3. Specifications

3.1 Goniometer Main Body

(1) Topography: By the double crystal method of (+, -) parallel arrangement.
Topography by the transmission and reflection methods can be made.

(2) Goniometry: Automatic recording of the rocking curve can be made. Relative measurement of lattice constants iw also possible.

(3) Sample size: Wafer of 6" max. dia.

(4) X-ray source-to-sample distance: 1,400 mm

(5) ω_1 axis-to-ω_2 axis distance: 250 mm

(6) ω rotary plate:

a. Coarse setting: Manual setting over 0~150° can be made.
Reading in units of 1° by scale and index.

b. Fine adjustment: Remote control by sine bar can be made with a stepping motor.

(7) Scanning stage:

a. Scanning speed: 0.5, 1 mm/sec; stepping motor

b. Scanning range: Within ± 78 mm preset

(8) Rotary base: A base which can rotate coaxially with ω_1 with the 2nd crystal section mounted on it.
Approx. ± 30°, clamping is possible.

(9) 1st crystal section:

a. Rotation in the plane: ±5° remote-control rotation can be made.

b. Translation: Positional adjustment of crystal, ±5 mm, manual.

c. Crystal holding: For reflection and transmission, two kinds.

(10) 2nd crystal section:

a. Crystal orientation adjustment can be made by two arcs that are orthogonal

to each other. Rotatable over ±5° respectively.

Rotation of the upper arc by manual operation, remote-control rotation of the lower are by DC motor.

Remote control of either inclination rotation or rotation in the plane depending upon the arrangement of a sample holding metal fitting.

b. Translation: Positional adjustment of crystal, ±5 mm, manual.

ω2 rotation:

Coarse rotation Remote-control rotation by worm & worm-wheel. Reading in units of 1° by scale and index.

Fine rotation: Remote-control rotation over an approximate range of 3° can be made by the sine bar system using a stepping motor.

d. Crystal holding: Metal fittings for reflection and transmission, two kinds.

e. Film cassette: Accommodates 7" square film or dry plate.
To be held by a rotational holder coaxial with the ω_2 axis.

(11) Incident beam slit:

a. Curved slit: For MoKα: Si(220), Si(400), two kinds
For CuKα: Si(422), (511), (440), three kinds

b. For rocking curve Analysis: 1 mm W. x 5 mm H.

c. For zero alignment: 0.2 mm W. x 5 mm H.

d. Height limiting slit: 50, 75, 100, 125 mm

(12) Variable slit, between C1 and C2:

To be held by a rotary plate which is coaxial with the ω rotation plate. The slit permits removal and reinstallation.

The slit piece can be moved independently and allows setting over 0 to 15 mm width.

A height limiting plate for rocking curve measurement is provided.

(13) Variable slit, between C2 and film cassette:

To be held by a 2θ rotation plate which is to hold the detector. The slit permits removal and reinstallation. Manual setting over 0 to 10 mm width.

(14) 2θ rotation plate:

a. Coaxial rotation with the ω rotation plate. The X-ray detector is to be mounted on it. Permits manual setting over the range of 0 to 120°.

b. Detector holder

With the X-ray EYE CCD vision camera and the scintillation counter probe mounted, this holder allows 0 to 350 mm moving in the tangential direction of 2θ rotation.

Stepping Motor driven.

Moving in the vertical direction is allowed, motor driven.

Moving in the back-and-forth direction is allowed, manual.

(15) Vacuum path: An evacuable X-ray inducing cylinder designed to avoid X-ray absorption by air.