

[54] HIGH RESOLUTION TECHNIQUE AND INSTRUMENT FOR MEASURING LATTICE PARAMETERS IN SINGLE CRYSTALS

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[57] ABSTRACT

A method of measuring the lattice parameter in an un-

known single crystal by comparing its diffraction angle to a standard single crystal, on a double-crystal diffractometer is disclosed. The method comprises several steps including mounting the unknown and standard crystals on a mounting block of the second stage of a double-crystal diffractometer aligning a tilt axis of the crystal surface with an x-ray beam and the azimuth axis of the second stage crystal mount, rotating the mounting block until the normals of the crystals have equal vertical components, tilting the crystal about the azimuth axis until the crystal normals are in line with the x-ray beam measuring the angle of the sharpest diffraction peak from each crystal while moving the crystals laterally across the beam, rotating the crystal mounting block assembly by 180 degrees about the azimuth axis while maintaining the relative tilt between the two wafers, such that the same area of the crystal surface remains in the x-ray beam during the 180 degrees rotation, sequentially measuring the angle of sharpest diffraction peak of both crystals after rotation, and calculating the diffraction angle of the unknown crystal from the standard crystal diffraction angle by using the diffraction angles measured before and after rotation by 180 degrees and thereby removing any misorientation of the crystal normals in the horizontal plane. A novel device for performing the tilt corrections of the crystals is also disclosed.

7 Claims, 6 Drawing Sheets

