Distribution Patterns of Strain and Dislocations Around Indented Areas in Germanium Crystals as Observed by X-Ray Topography

ABSTRACTS OF PAPERS

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Distribution Patterns of Strain and Dislocations Around Indented Areas in Germanium Crystals as Observed by X-Ray Topography*

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Abstract

Three-dimensional distribution patterns of the strain and dislocations developed around indented areas in germanium crystals are observed as a function of the deformation temperature between 20° and 700°C by use of X-ray diffraction topography. The size of the deformed region around an indented area is found to have a relationship with the hardness value, i.e., the former begins to increase abruptly at the temperature where the latter begins to decrease abruptly as the deformation temperature is raised. The areas indented at high temperatures are subjected to two kinds of treatments: One group of areas is brought to room temperature after indentation while an indenter load is applied, and the other is cooled after an indenter load has been removed. Rearrangement of dislocations takes place during annealing of specimens. Annealing brings about a configuration of dislocations lying parallel to ⟨110⟩ directions.

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