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Development of a Non-Invasive Quality Control System for Semiconductor Wafer Inspection

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Group II-VI semiconductors are being explored for room-temperature X-ray imaging due to their excellent properties, especially high resistivity and wide bandgap. However, their performance is often limited by crystalline defects and surface imperfections that trap charges and increase leakage currents.
Wafer inspection to ensure the quality of base materials through optical means prior to hybridization could positively impact detector production yield with these materials. These techniques include non-destructive examination of the wafer's surface topography and internal structure to guarantee chip functionality and reliability.
This work focuses on the development of a quality-control protocol to characterize semiconductor base materials, including complementary techniques such as IR transmission microscopy for bulk defects and Scanning Electron Microscopy (SEM) for surface morphology.

Abstract

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