

A method to evaluate the depth profile of crystal defects in CZ silicon wafer using photoluminescence imaging

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Abstract

Specifying the depth profile of crystal defects in CZ silicon wafer is an important step in defect engineering. An effective evaluation of defect depth profile leads to the delineation of thermal history of silicon ingot during crystal growth. The evaluation methods for Crystal Originated Pits (COP) free zone and Bulk Micro Defects (BMD) denuded zone such as light scattering tomography (LST), optical microscopy (OM), and scanning surface inspection system (SSIS) with the repeated polish process are destructive and time consuming. The photoluminescence (PL) imaging developed maps the PL variation across the silicon wafer owing to the combination of PL spectroscopy and confocal optical microscopy. It is also compliant with in-line industrial metrology standards: non-destructive, fast, reliable, and high

resolution. This study evaluates the PL Imaging developed by Semilab (En-Vision) comparing with the results of OM, LST, and SSIS methods [1–5].

Biography

Hu Hao studied his PhD from Lappeenranta University of Technology (LUT), Finland and Master's Degree from Nanyang Technological University (NTU), Singapore. He is the director of Analytical Test Centre in Advanced Silicon Technology, China and the senior advisor of Material Physics Laboratory, LUT. He has published several papers and patents in the domain of semiconductor defect engineering.