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THE STUDY ON THE ANALYSIS OF THERMAL PROPERTIES OF SEMICONDUCTORS USING LASER LOCK-IN THERMOGRAPHY

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ABSTRACT

Lock-in thermography(LIT) is a well-known analytical technique for defect inspection of semiconductors. We have developed a method for measuring the thermal properties of semiconductors using laser LIT. The method obtains the thermal diffusion length in the vertical direction of the sample using the phase information and the thickness of the sample. The thermal diffusion length is a special dimension that represents the distance of heat conduction per one cycle. Thermal diffusivity is estimated by using the lock-in frequency and the thermal diffusion length. For validation of the method, Pyroceram 9606 sample as a reference material was measured in the lock-in frequency range of 0.1 to 10 Hz. In addition, thermal properties of Silicon, Copper and a semiconductor chip were measured, and the results are discussed along with the optical measurement conditions..

KEYWORDS: Semiconductors, Thermal diffusivity, Laser lock-in thermography