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Photomodulated optical reflectance : a fundamental study aimed at non-destructive carrier profiling in silicon

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Abstrak

One of the critical issues in semiconductor technology is the precise electrical characterization of ultra-shallow junctions. Among the plethora of measurement techniques, the optical reflectance approach developed in this work is the sole concept that does not require physical contact, making it suitable for non-invasive in-line metrology. This work develops extensively all the fundamental physical models of the photomodulated optical reflectance technique and introduces novel approaches that extend its applicability from dose monitoring towards detailed carrier profile reconstruction. It represents a significant breakthrough in junction metrology with potential for industrial implementation.