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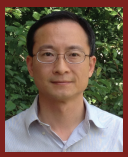
Prof. Yanfa Yan
University of Toledo, USA

Capacitance spectroscopy refers to the techniques for characterizing the electrical properties of semiconductor materials, junctions, and interfaces, all from the dependence of device capacitance on frequency, time, temperature, and electric potential. This book contains 15 chapters written by world-recognized, leading experts in the field, academia, national institutions, and industry, divided into four sections: Physics, Instrumentation, Applications, and Emerging Techniques. The first section establishes the fundamental framework relating capacitance and its allied concepts of conductance, admittance, and impedance to the electrical and optical properties of semiconductors. The second section reviews the electronic principles of capacitance measurements used by commercial products, as well as custom apparatus. The third section details the implementation in various scientific fields and industries, such as photovoltaics and electronic and optoelectronic devices. The last section presents the latest advances in capacitance-based electrical characterization aimed at reaching the nanometer-scale resolution.



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