

Public Abstract

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In recent years, major research funding and commercial development has been going toward the production and characterization of increasingly useful nanomaterials. These materials such as quantum dots, nanoparticles, and thin films can increase the efficiency of solar panels, create new treatments for cancer, and vastly improve the detection capabilities for various optical sensors for biosensing. Unfortunately, to date, very few methods of characterizing these types of materials exist such as scanning electron microscopy and ellipsometry. These techniques are prohibitively expensive, cannot be used with all materials, and require rigorous preparation schemes before scanning. Therefore, a new method to characterize thin films and detect the properties of nanomaterials is needed. This study proposes a newly revived method, Total Internal Reflection Photoacoustic Spectroscopy, along with related techniques, to deliver cost effective characterization and detection for nanomaterials and thin films.