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Title

Terahertz ellipsometry and terahertz optical-hall effect

Source

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Abstract

Ellipsometry has been proven as an excellent tool for the precise and accurate determination of material optical properties in the spectral range from the far infrared to the vacuum ultraviolet. In the terahertz frequency domain, however, ellipsometry is still in its infancy. Here we report on our recent development of rotating optical element frequency domain terahertz ellipsometry using electron-beam based, quasi-optical light sources. We demonstrate that high power backward wave oscillator type sources are readily available for the use in spectroscopic ellipsometry instrumentation for the terahertz spectral range. We review recent results on the application of terahertz ellipsometry. Exemplarily, the contact-free optical determination of free-charge carrier properties for very small doping concentrations and doping profiles in iso- and aniso-type Si homojunctions will be discussed. Furthermore, terahertz optical-Hall effect measurements on high-mobility epitaxial graphene on SiC and very low-doped Si are presented. [All rights reserved Elsevier]. (70 References).