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Title:Photocarriers dynamics in silicon wafer studied with optical-pump terahertz-probe spectroscopy

Authors:Li, Gaofang (1); Li, Dong (1); Jin, Zuanming (1); Ma, Guohong (1)

Author affiliation:(1) Department of Physics, Shanghai University, 99, Shanghai 200444, China; (2) Laboratory for Microstructures, Shanghai University, 99 Shangda Road, Shanghai 200444, China

Corresponding author:Ma, G.(ghma@staff.shu.edu.cn)

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Abstract:Optical pump-terahertz probe spectroscopy is employed to investigate the optical characteristics of silicon wafer. The wafer surface undergoes a phase transition from insulator to metal for terahertz wave with increasing pump fluence. The real part of the pump-induced conductivity shows strong frequency dependence, which can be well described with Drude-Smith model. Our results also demonstrate that the photoexcited Si layer acts as a broadband terahertz pulse antireflection coating with proper pump fluence. In addition, it is observed that the terahertz pulse apparently arrives at the detector earlier when silicon is optically excited. © 2012 Elsevier B.V. All rights reserved.

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Main heading:Silicon wafers

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Uncontrolled terms:Anti-reflection - Broadband terahertz pulse - Frequency dependence - Insulator to metal - Optical characteristics - Optical pump-terahertz probe - Optical-pump terahertz-probe spectroscopy - Photo-carriers - Pump fluence - Real part - Si layer - Terahertz pulse - Wafer surface

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