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Title:Characteristics of THz carrier dynamics in GaN thin film and ZnO nanowires by temperature dependent terahertz time domain spectroscopy measurement
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Abstract:We present a comprehensive study of the characteristics of carrier dynamics using temperature dependent terahertz time domain spectroscopy. By utilizing this technique in combination with numerical calculations, the complex refractive index, dielectric function, and conductivity of n-GaN, undoped ZnO NWs, and Al-doped ZnO NWs were obtained. The unique temperature dependent behaviors of major material parameters were studied at THz frequencies, including plasma frequency, relaxation time, carrier concentration and mobility. Frequency and temperature dependent carrier dynamics were subsequently analyzed in these materials through the use of the Drude and the Drude-Smith models. [All rights reserved Elsevier].
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Inspec controlled terms:carrier density - carrier mobility - dielectric function - gallium compounds - III-V semiconductors - II-VI semiconductors - nanowires - refractive index - semiconductor thin films - temperature measurement - terahertz spectroscopy - wide band gap semiconductors - zinc compounds
Uncontrolled terms:terahertz carrier dynamic characteristics - thin film - nanowires - temperature dependent terahertz time domain spectroscopy measurement - complex refractive index - dielectric function - temperature dependent behaviors - plasma frequency - relaxation time - carrier concentration - temperature dependent carrier dynamics - Drude-Smith models - GaN - ZnO:Al
Inspec classification codes:A7360L Electrical properties of II-VI and III-V semiconductors (thin films/low-dimensional structures) - A7280E Electrical conductivity of II-VI and III-V semiconductors - A0765 Optical spectroscopy and spectrometers - A7145G Exchange, correlation, dielectric and magnetic functions, plasmons - A7220F Low-field transport and mobility; piezoresistance (semiconductors/insulators) - A6855 Thin film growth, structure, and epitaxy - A6865 Low-dimensional structures: growth, structure and nonelectronic properties - B2520D

II-VI and III-V semiconductors - B7320R Thermal variables measurement
Chemical indexing:GaN/bin Ga/bin N/bin;ZnO:Al/ss ZnO/ss Al/ss Zn/ss O/ss ZnO/bin Zn/bin O/bin Al/el Al/dop
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Discipline:Physics (A); Electrical/Electronic engineering (B)
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