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Accession number:20122415122306

Title:Extraordinary optical transmission and extinction in a Terahertz wire-grid polarizer

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Source title: Applied Physics Letters

Abbreviated source title: Appl Phys Lett

Volume:100

Issue:23

Issue date:June 4, 2012

Publication year:2012

Article number:231912

Language:English

ISSN:00036951

## CODEN:APPLAB

Document type: Journal article (JA)

Publisher:American Institute of Physics, 2 Huntington Quadrangle, Suite N101, Melville, NY 11747-4502, United States

Abstract:A THz wire grid polarizer is simulated and demonstrated consisting of 40-μm periodic aluminum strips mounted on a polycarbonate substrate with a variable metal-to-gap ratio. Full-wave numerical simulations were performed from 100 GHz to 550 GHz predicting that the transmission in perpendicular (parallel) polarization is much higher (lower) than that predicted by geometric optics, leading to a very high extinction ratio of ∼60 dB between 100 and 550 GHz when the gaps become very small (<5 &mu;m). This behavior is confirmed qualitatively in experiments between 100 and 530 GHz where extinction ratios exceeding 40 dB are achieved. These results are explained physically as an electromagnetic concentration effect in the gaps consistent with plasmonic-like behavior. The effect depends critically on gap width and weakly on frequency. &copy; 2012 American Institute of Physics.

Number of references:13

Main heading:Light extinction

Controlled terms: Physical properties - Physics

Uncontrolled terms:100 GHz - Concentration effects - Extinction ratios - Extraordinary optical transmission - Gap widths - Geometric optics - Polycarbonate substrates - Tera Hertz - Wire grid polarizers

Classification code:741.1 Light/Optics - 931 Classical Physics; Quantum Theory; Relativity - 931.2 Physical Properties of Gases, Liquids and Solids - 932 High Energy Physics; Nuclear Physics; Plasma Physics - 933 Solid State Physics

DOI:10.1063/1.4724315

Database:Compendex

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