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标题: Terahertz wave filter based on frequency-selective surface structure
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摘要: Terahertz radiations, which refer to the frequencies from 100GHz to 10THz, lie in the frequency gap between the infrared and microwave, have received considerable attention during the past decades. Due to their special prosperties, THz radiations have been applied in many fields such as gases, semiconductors, explosives materials, and environment pollutants. The technique is based on recording the time dependence of the electric field of a short electromagnetic pulse transmitted through a sample. The ratio of the Fourier transforms of the data recorded with and without the sample yields the complex transmission coefficient of the sample in the frequency domain. The absorption coefficient and the refractive index of the material studied are directly related to the amplitude and phase respectively of the transmitted field. Terahertz wave filter, a frequency-selective surface structure, has been characterized by terahertz time-domain spectroscopy in the region from 0.1 to 3THz. We have compared THz-TDS measurement and calculation results of the mode-matching theory of the terahertz wave filter, and find that the two data sets agree very closely. The peak of the transmittance of about 90.5% occurs at 0.45THz for the first case and the peak of the transmittance of about 89.4% occurs at 0.79THz for the second case.
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