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Title:Design and characterization of a terahertz microcavity structure
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Abstract:The complex refractive indices of the Cr film are obtained by terahertz time-domain spectroscopy. The penetration depth the Cr film is calculated based on the complex refractive indices, and then the effective cavity length and the emitted spectrum of the structure Cr/GaAs/Cr are simulated. The resonant frequencies are located at 0.32, 0.65, 0.98, 1.31 and.1.65 THz, respectively. The peak intensity of the cavity photo-conductive resource at 0.32 THz is 25 times higher than that of non-cavity one and the full width at half maximum is greatly narrowed. The relation between the emitting dipoles and the standing wave field in the cavity is also discussed. The results show that the emission intensity is enhanced when the emitting dipoles are located at the nodes of the standing wave field, but greatly suppressed at antinodes.
Number of references:17
Inspec controlled terms:chromium - gallium arsenide - III-V semiconductors - metallic thin films - metal-semiconductor-metal structures - microcavities - optical design techniques - refractive index - terahertz wave spectra
Uncontrolled terms:terahertz microcavity structure design - complex refractive index - terahertz time-domain spectroscopy - penetration depth - effective cavity length - resonant frequencies - emitting dipoles - emission intensity - frequency 0.32 THz - frequency 0.65 THz - frequency 0.98 THz - frequency 1.31 THz - frequency 1.65 THz - Cr-GaAs-Cr
Inspec classification codes:A7870G Microwave and radiofrequency interactions with condensed matter - A7820D Optical constants and parameters (condensed matter) - A7865E Optical properties of metals and metallic alloys (thin films/low-dimensional structures)
Numerical data indexing:frequency 3.2E+11 Hz;frequency 6.5E+11 Hz;frequency 9.8E+11 Hz;frequency 1.31E+12 Hz;frequency 1.65E+12 Hz
Chemical indexing:Cr-GaAs-Cr/int GaAs/int As/int Cr/int Ga/int GaAs/bin As/bin Ga/bin Cr/el
Treatment:Experimental (EXP)

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