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Title:Passive imaging and emissivity measurement with a 4 K-cryocooled terahertz photoconductive detector
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Abstract:We have demonstrated terahertz (THz) passive imaging of room-temperature objects using a 4 K-cryocooled THz photoconductive detector with background limited infrared performance (BLIP) at around 1.5-2.5 THz. Images of a safety razor blade and a coin concealed in a plastic package or an envelope are successfully obtained with spatial resolutions of wavelength order using the THz passive imaging system. We have compared the measured THz intensity of several materials with emissivities calculated using the reported optical constants. The result shows that the THz intensity has a good linear relation to the emissivity, which means THz emissivity of an unknown material can be estimated at a room-temperature with the THz passive imaging system.
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Inspec controlled terms:cryogenics - emissivity - photoconductivity - terahertz wave imaging
Uncontrolled terms:terahertz passive imaging - emissivity measurement - 4 K-cryocooled terahertz photoconductive detector - background limited infrared performance - safety razor blade - plastic package - spatial resolutions - optical constants - frequency 1.5 THz to 2.5 THz - temperature 293 K to 298 K
Inspec classification codes:B7310N Microwave measurement techniques - B4210 Photoconducting materials and properties
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