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Title:Design of a wide-band and quasi-omnidirectional tabulate metamaterial absorber in the terahertz regime

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Abstract:We report the design of a wide-band and quasi-omnidirectional tabulate metamaterial absorber in the terahertz regime. Simulated results indicate that the absorber has a wide-band strong absorption between 4.36 and 4.91 THz, which is polarization insensitive and wide incident angle. Retrieved real parts of the impedance show that by adjusting the electromagnetic response of the metamaterial, the impedance of the absorber could be tuned to match approximately the impedance of the free space on one side and do not match to the impedance of the free space on the other side, resulting in the minimal reflectance, the minimal transmission and the highest absorbance in the absorption band. Simulated absorbance values under three different loss conditions suggest that high absorbance is mainly due to metallic absorption and dielectric loss can be used to absorb partial energy if there is no metallic absorption. Simulated absorbance values under different electric conductivity values and copper thicknesses suggest that the intensity of metallic absorption can be boosted up by adopting metal of high conductivity or reducing the thickness of metal properly. This absorber may have broad applications in many scientific and technological fields.

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