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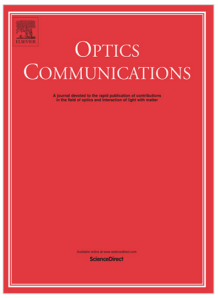

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An ultra-broadband and polarization-independent metamaterial absorber with bandwidth of 3.7 THz

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In this paper, we put forward an ultra-broadband terahertz Metamaterial Absorber (MA) with bandwidth of 3.7 THz, which consists of a double split quoit absorption layer, a dielectric layer, and a metal layer. By properly choosing the dielectric material and optimizing the structure parameters of MA, the average absorption greater than 96.66% from 1.95THz to 5.65THz for both transverse-electric (TE) and transverse magnetic (TM) polarizations is achieved. The obtained high absorption and ultra-broadband are due to the strong dipole oscillation, absorption peaks overlap. The equivalent circuit model of the MA was extracted and studied, and the absorption of the equivalent circuit model shows good agree with the finite element simulation. Moreover, the designed MA is easy to manufacture, insensitive to the incident polarizations with high absorption. Therefore, it is favorable for various THz imaging, detecting and other applications.

Keywords: Perfect absorber, Equivalent Circuit Model, Ultra-Broadband, Polarization- Independent.

1. Introduction

The MAs have attracted considerable interests in recent years for their ability to absorb incident waves with nearly unity absorption[1-3]. In 2008 years, Landy et al[4] proposed and demonstrated the first MA, and the MA is composed of a metallic split ring, a cut wire and a dielectric layer. The