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标题: Enhanced terahertz transmission by surface plasmon resonance
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摘要: The surface plasmon resonance (SPR) between metal and dielectric material has a good enhancement on electromagnetic wave transmission. In this paper, a series of two-dimension (2D) metal gratings and spiral structures with different geometrical size were experimentally tested by Terahertz time-domain spectroscopy (THz-TDS). The experiment results show that the 2D metal gratings have almost 70% increment on terahertz transmission than the pure silicon substrate in the range of 0.2-2.5THz, which indicates a strong coupling in the terahertz range, and the resonance mode shows a blue shift. On the other hand, the influence of different radiation directions was analyzed. It presents that the slightly higher transmission can be achieved when terahertz wave radiate from the front side than the back side. It reveals that surface plasmon resonance can enhance the terahertz transmission efficiently and has potential applications in security imaging, biological analysis and spectroscopy.
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