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Title

Theoretical and experimental research on designer surface plasmons in a metamaterial with double sets of circular holes

Source

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Abstract

The designer surface plasmons (DSPs) are studied by the use of a kind of metamaterial with a structure of double sets of circular holes: subwavelength apertures, and indentations. The diameter and spacing of the indentations are smaller at least one order of magnitude than those of the apertures. A theoretical model is built to analyze the DSPs sustained by the indentations by using effective dipoles method. The influence of the DSPs on the transmission property is revealed for electromagnetic waves passing through the apertures. In order to verify the theoretical predication, a set of the metamaterial samples is made and the transmission spectra are measured in microwave regime. Our results provide a new proof for the existence of DSPs and are promising for proposing some techniques for optoelectronic devices in terahertz and microwave regime. (22 References).

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