

Narrowband reflection-and-transmission filter in an annular defective photonic crystal containing an ultrathin metallic film

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Abstract

The filtering properties for a narrowband reflection-and-transmission filter in an annular defective photonic crystal containing an ultrathin and strongly lossy metallic film are theoretically investigated based on the transfer matrix method for the cylindrical Bragg waves. At a certain design wavelength, simultaneous peaks in reflectance and transmittance can be found. The peak wavelength is shown to be dependent on the azimuthal mode number of the cylindrical waves. The peak heights in reflectance and transmittance can be directly varied by the stack numbers. In addition, the influence of the starting radius in reflectance and transmittance is also illustrated.

Keyword : Annular photonic crystal, Narrowband filter, Cylindrical wave