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Title:Magnetically tunable silicon-ferrite photonic crystals for terahertz circulator
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Abstract:The gyromagnetic properties of ferrite materials and the nonreciprocal property of a silicon-ferrite photonic crystal cavity are investigated in the terahertz region. Through the structure optimization and analysis of defect mode coupling, we design a magnetically tunable circulator, of which central operating frequency can be tuned from 180 to 205 GHz and the maximum isolation is 65.2 dB. Moreover, the further study shows that the gyrotropy, dispersion, and ferromagnetic loss of ferrite materials under the different external magnetic fields greatly affect the transmission and isolation property of this device. This circulator is flexible to realize functions of controllable splitting, routing, filtering and isolation by changing the external magnetic field for the THz applications. 
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