

Polarization-independent guided-mode resonance filter with cross-integrated waveguide resonators

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A cavity-resonator-integrated guided-mode resonance filter (CRIGF) has been proposed and investigated in order to realize high-efficiency narrowband reflection with a small aperture. The CRIGF consists of a grating coupler integrated in a cavity resonator constructed by a pair of distributed Bragg reflectors on a thin-film waveguide. This time, orthogonally crossed integration of two CRIGFs was demonstrated in order to obtain polarization-independent reflection spectrum. An SiO₂-based device with 10 μm aperture was designed and fabricated for around 850 nm wavelength operation, and narrowband polarization-independent reflection was confirmed experimentally. © 2012 Optical Society of America

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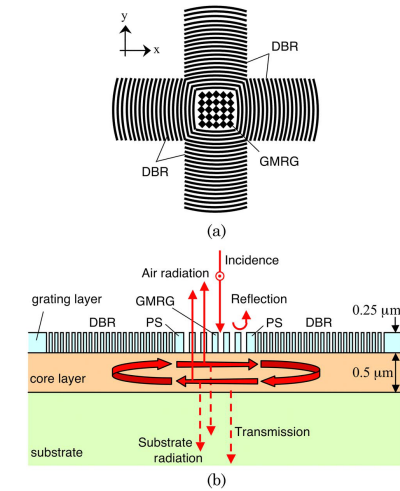


Fig. 1. (a) Schematic top view and (b) crosssectional structure of the designed X-CRIGF.

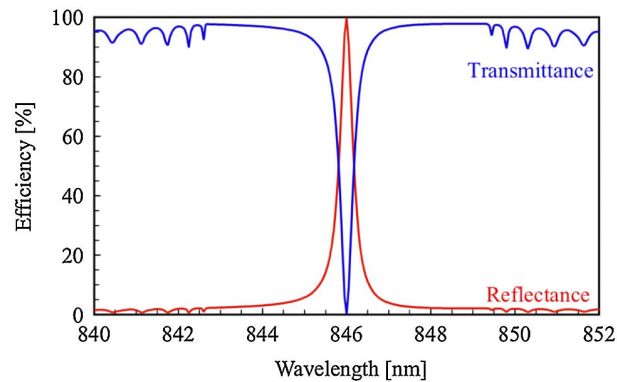


Fig. 2. Theoretically calculated transmittance and reflectance spectra of the designed X-CRIGF with 10 μm aperture.

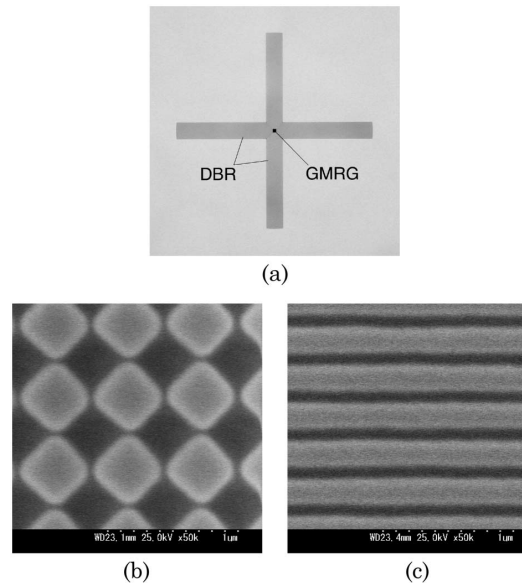


Fig. 3. Photographs of the fabricated X-CRIGF.
(a) The whole;
(b) GMRG part, and (c) DBR part.

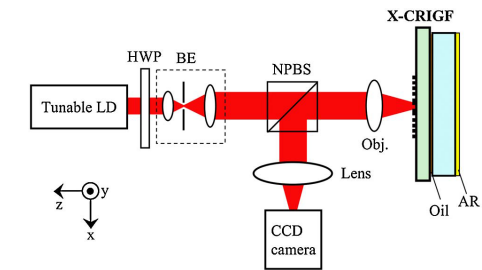


Fig. 4. Optical experimental setup.

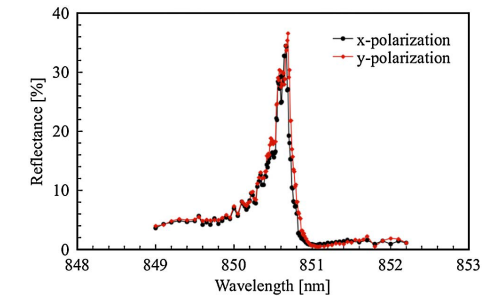


Fig. 5. Measured reflectance spectra of the fabricated X-CRIGF of 10 μm aperture for x-polarized and y-polarized incident beams.