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Characterization of triangular-structured two-dimensional photonic crystals designed for visible wavelengths. JEFFREY CLARK, MICHAEL MARCINIAK, ROBERT NELSON, Air Force Research Laboratory, JAMES LOTT, Air Force Institute of Technology — The growing number of fabrication techniques of photonic crystals (PhC) is increasing the number of applications for these devices. This work focuses on the fabrication and characterization of triangular-structured, two-dimensional PhC designed for visible wavelengths. The fabrication processes studied for this PhC are focused ion beam, electron lithography, photolithography, and holographic photo-polymerization/lithography. The fabrication techniques and materials used to create the PhC in part determine the characterization technique required to investigate the PBG. Techniques examined here include the coupling of a beam by means of a prism into a wave-guiding medium in which the PhC has been fabricated, and the guiding of a beam to a PhC through a cylindrical glass container filled with an index matching medium. Analyses of the transmission and reflectance properties of a PhC for various incident angles confirm the presence of a PBG. The design of the PhC was based on a program created to display gap maps for triangular structures. The PBG of the structure, designed from the gap maps, was modeled using another program created to display band diagrams for triangular structures. Finally, FDTD modeling and simulation results are compared to the experimental results.

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