

Analysis of defect layers' insertion effect on optical transmission properties of multilayer structures based on one-dimensional photonic crystals

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Abstract :

In this paper, we are interested in the analysis of the transmission spectrum of several multilayer structures based on one-dimensional photonic crystals (1D PCs) infiltrated with different kinds of defect materials, such as bismuth oxide (Bi_2O_3), lithium niobate (LiNbO_3), and E7 liquid crystal (LC). A 1D PC acting as a multichannel filter is constructed by inserting multiple Bi_2O_3 defect layers, while a localized mode is moved by applying various electric fields on a LiNbO_3 defect layer inserted in the middle of a 1D PC structure used as a tunable device. A localized mode is also tuned by applying different magnetic fields on an E7 LC phase shifter inserted between $\text{SiO}_2/\text{TiO}_2$ alternative layers.

Source : <http://www.opticsinfobase.org/ao/abstract.cfm?uri=ao-52-3-474>