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Negative index of photonic crystal infiltrated with functional materials RYOTARO OZAKI, Alan G. MacDiarmid NanoTech Institute, The University of Texas at Dallas, HIROSHI MORITAKE, Department of Electrical and Electronic Engineering, National Defense Academy of Japan, KATSUMI YOSHINO, Shimane Institute for Industrial Technology, ANVAR ZAKHIDOV, Alan G. MacDiarmid NanoTech Institute, The University of Texas at Dallas — We study 2D or 3D photonic crystals infiltrated with functional materials such as liquid crystal, or a highly polarizable medium. Liquid crystal molecular orientations in photonic crystals strongly influence the light propagation. We reveal that the negative index of the photonic crystal depends on the liquid crystal molecules, which can be tuned by external electrical field or temperature. On the other hand, we also study negative index of photonic crystal with a highly polarizable medium having a frequency dependence of permittivity. Around anomalous dispersion frequency range, the photonic crystal with a highly polarizable medium shows unique characteristics due to coupling with polariton.

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