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Title:Temperature-dependent absorbance spectra of semiconductor-dielectric photonic crystals Authors:Barvestani, Jamal (1)

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Abstract:Terahertz absorbance spectra of defective and non-defective semiconductor-dielectric photonic crystals are theoretically investigated. Two structures with a strongly temperature-dependent permittivity will be considered at different temperatures. First, non-defective structure of (Si0<inf>2</inf>/InSb)<sup>N</sup> and second, defective structure of (Si0<inf>2</inf>/InSb)<sup>N</sup> and second, defective structure of (Si0<inf>2</inf>/InSb)<sup>N</sup> and second, defective structure of (Si/SiO<inf>2</inf>/Si)<sup>N</sup> which is completely similar to the structure reported by Hung et al. (J. Appl. Phys. 110, 093110 (2011)). We have shown that in the non-defective structure the peak of absorbance takes place at band edges and the peak height is nearly 55% of incidence at 325 K and decrease to 12% at 225 K. In the second structure the most absorption takes place in defect mode frequency which is at least three times larger than band edge absorption. By increasing the temperature from 225 K to 325 K, the height of absorption increases from 6.8% to 50% of incident radiation and is slightly shifted to upper frequencies. © 2012 WILEY-VCH Verlag GmbH & amp; Co. KGaA, Weinheim.

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Main heading: Photonic crystals

Controlled terms:Defects - Indium antimonides - Semiconductor materials

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