183
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Abstract:We have fabricated a very narrow bandpass tunable terahertz (THz) filter based on a one-dimensional photonic crystal cavity. Since the filter consists of silicon wafers and air spacers, it has a very high quality factor of about 1500. The full width at half maximum (FWHM) of the passband is only about 200 MHz, and the peak transmission is higher than-4 dB. Besides, the central frequency can be tuned rapidly over the entire bandgap with the length of cavity adjusted by a motorized linear stage. Further analytical calculations indicate that a high-Q tunable filter with both high peak transmission and wide tunable range is possible if thinner silicon layers are used. © 2012 Optical Society of America.
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