

## **Silicon-based Photonic Crystal Gas Sensors**

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The bandstructure of photonic crystals offers intriguing possibilities for the manipulation of electromagnetic waves. We suggest utilization of photonic crystals as an optical sensor in the infrared spectral region for qualitative and quantitative gas analysis. Taking advantage of the low group velocity and certain mode distributions for some k-points in the bandstructure of a photonic crystal should enable the realization of very compact sensor devices for mobile applications. We prepared sensing elements based on macroporous silicon photonic crystals consisting of up to 1000 of pore rows and measured the transmission with and without gas through the porous sensing element. We observed an enhancement in sensitivity of about 3 to 4 compared to a gas cell without a photonic crystal. Limitations of this technology being based on low group velocity modes inside photonic crystals are discussed.