

## Enhanced photoluminescence from silicon photonic crystal nanocavities

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Large enhancement of silicon photoluminescence (PL) is demonstrated by introducing photonic crystal (PhC) nanocavities at room temperature. Silicon will be an attractive material for light emitters if extraordinary emission efficiency can be achieved in spite of its indirect nature of the optical transition. PhC nanocavities can be utilized for enhancing light emission of silicon. We fabricate air-bridge-type L3 PhC nanocavities in a SOI substrate and observe sharp PL peaks corresponding to cavity modes. PL intensity at a cavity mode is  $\sim 350$  times larger than that of a SOI substrate (see the bottom traces in Fig.). From this result and the analysis of light extraction efficiency based on FDTD calculations, at least a 7-fold enhancement of emission efficiency is expected in a PC nanocavity compared with that in a substrate.

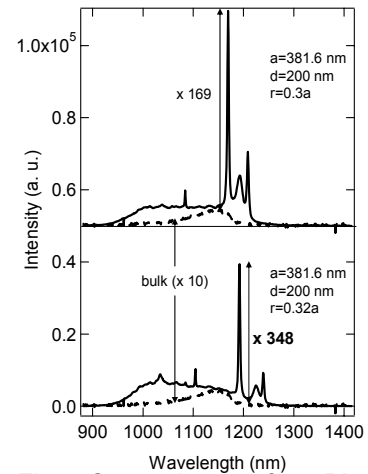


Fig. Comparison of  $\mu$ -PL spectra for PhC cavities with that for bulk.