Quality factors of nonideal micro pillars

The influence of fabrication-induced imperfections and material absorption on the quality (Q) factor of a microcavity pillar is studied numerically. The dependence on sidewall inclination, selective underetch, and intrinsic loss is quantified. The authors show that imperfections can lead to an improvement in Q and that a sidewall inclination angle of less than 1° causes a dramatic change in the Q factor. The variations in Q can be attributed to a delicate balance between effective index contrasts, mode overlap, and higher-order mode contributions.

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