

Focused thermal beam direct patterning on InGaN during molecular beam epitaxy growth

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Abstract:

During InGaN epitaxy growth, the material surface is exposed to a small diameter pulse laser beam that is controlled by scanning mirrors. Local heating effects are observed at the points of exposure. The materials are characterized by Wavelength Dispersive Spectroscopy (WDS), Scanning Electron Microscopy (SEM) and Photoluminescence (PL). In mole fraction of written materials is reduced where laser exposure takes place. The effect of local thermal heating appears to enhance surface diffusion while not causing ablation or evaporation under the conditions studied. PL efficiency is significantly increased by focused thermal beam exposure. Laser written regions have 7 times higher PL intensity compared to non-written areas, which might be due to surface texturing that causes higher extraction efficiency.

Keywords: Direct patterning, InGaN, Molecular beam epitaxy