

Raman scattering study of GaN nanostructures obtained by bottom-up and top-down approaches

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Abstract. GaN nanocolumnar structures were grown by plasma-assisted molecular beam epitaxy (PAMBE) and also fabricated by electron cyclotron resonance reactive ion etching (ECR-RIE) of a compact GaN film parallel to the [111] direction of the Si(111) substrates. Scanning electron microscopy shows that the nanocolumns fabricated by PAMBE have a length of about 300–500 nm with diameters ranging from 20 to 150 nm while nanowhiskers formed by RIE have diameters of 40–80 nm and a height between 1.4 and 1.7 μm . A comparative study of the vibrational spectrum (including optical and interface phonons) of the nanostructures using conventional macro-Raman and micro-Raman scattering as well as surface-enhanced Raman scattering is presented.

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