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Preferential growth of zinc-blende and wurtzite GaN as effected by the conditions of MBE[1] BENJAMIN SHI, M.-H. XIE, The University of Hong Kong — Homoepitaxial growth of GaN on its (0001) or (111) may result in both wurtzite and zinc-blende phases. We have conducted a detailed study to identify the dependence on various conditions. The experiments show that at low substrate temperatures but high gallium fluxes, the meta-stable zinc-blende phase will be strongly favored, while at high temperatures and/or low gallium fluxes, thermal equilibrium wurtzite phase will dominate. There is no significant dependence of crystallographic structure on deposition rate observed. In the STM study of initial stage nucleation on wurtzite film, 2D islands of both phases have been identified and statistical relative stabilities of the two phases are obtained at different temperatures. The relative stabilities show a significant asymmetry at low versus high temperature, which indicates that preferential nucleation at the initial stage would determine the film's crystallographic structure.

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Benjamin Shi
The University of Hong Kong

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