Supporting Information

for

Nanometer-resolved mechanical properties around GaN crystal surface steps

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Finite size effects

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As stated in the text, finite size effects play a non-negligible role especially for the molecular dynamics simulations, in which the amount of atoms is restricting the size of the model domain. These result in different absolute bulk values of the indentation modulus for different contact radii. This phenomenon was studied systematically for a flatpunch indenter with contact radius r_c = 1 nm and an acting force of F = 25 nN on a cylindrical model domain, with a free cylinder barrel and a fixed cylinder base by using finite element simulations. Figure S1 shows the indentation modulus for GaN varying the height h and keeping the radius R of the model domain constant (black dots) and the other way round (red squares).

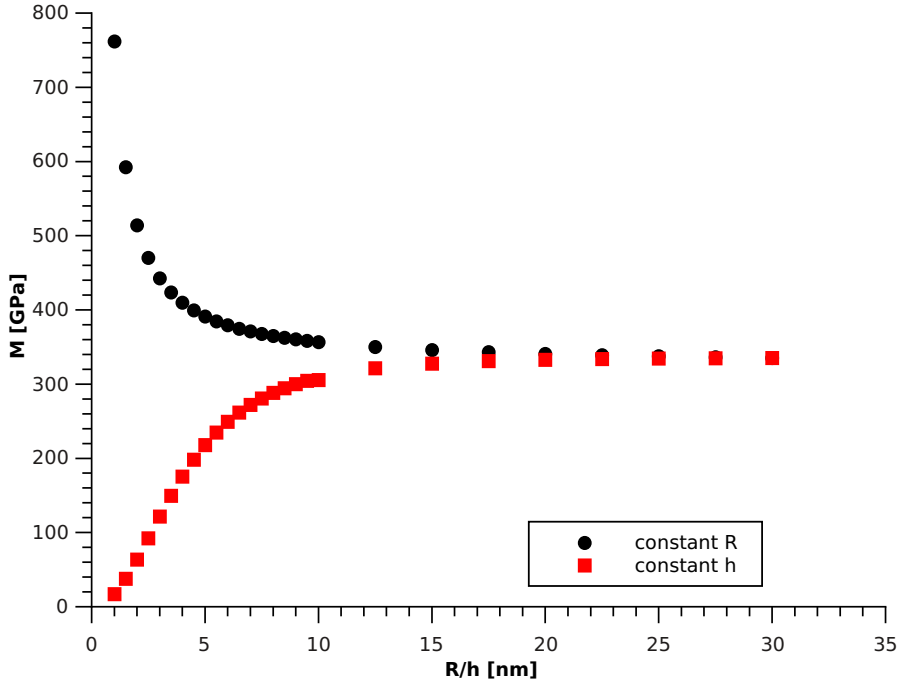

Figure S1: Changes of the indentation modulus due to finite size effects.

In summary, one can conclude from the scalability of continuum mechanics that one needs about twenty contact radii along the lateral and normal directions to get correct moduli within an error of 1%.