

Abstract Submitted
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The role of surface kinetics on defect generation and propagation during epitaxy of WBG semiconductors ANGEL YANGUAS-GIL, Argonne Natl Lab — One of the greatest challenges in the application of WBG semiconductors to power electronics and optoelectronic applications is how to mitigate the impact of electrically active defects on device performance. While this is an issue that traditionally has been tackled through process development, from a fundamental point of view we still have a limited knowledge on the interplay between epitaxial growth and defect generation. This interaction goes both ways, with surface kinetics promoting the formation surface defects that get incorporated into the bulk, and the surface defects and surface morphology driving the kinetics of the growth process. In this work we explore the interplay between surface kinetics and 0D and 1D defects during epitaxy. By combining molecular dynamics and kinetic Monte Carlo simulations we have focused on understanding how surface kinetics promotes the formation of defects, and identified the surface configurations that are more likely to lead to point defects incorporated in the bulk. Conversely, we have also studied the impact of existing defects, in particular the interaction of surface species and surface steps with threading dislocations. Our target materials are GaN, AlN, and SiC.

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