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Nanostressor growth on Silicon Nanomembranes[1] FRANK FLACK, BENJAMIN TREML, DONALD SAVAGE, MAX LAGALLY, University of Wisconsin - Madison — Single-crystal semiconductor nanomembranes (NMs) have great potential for microelectronic materials heterointegration. In particular, they allow for the fabrication of custom-strained, dislocation-free growth interfaces. However, thin substrates are extremely compliant and it is, therefore, crucial to understand the added effects of residual processing strain and substrate bonding. We study the strain distributions on silicon NMs transferred to patterned Si substrates such that some NM regions are bonded and others freestanding. As the critical thickness for Stranski-Krastanow growth of quantum dots (QDs) is very strain dependent, we decorate the surface with Ge quantum dots (QDs) and use the resulting distribution as an easily visible indicator of strain. We see dramatic differences between QD distributions on the bound and freestanding regions, and also between the bound regions and the bulk Si substrate, suggesting that the buried interface may influence nanostressor growth.

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