

In Situ Graphene Barriers for Remote Epitaxy of SiC Supplemental Document

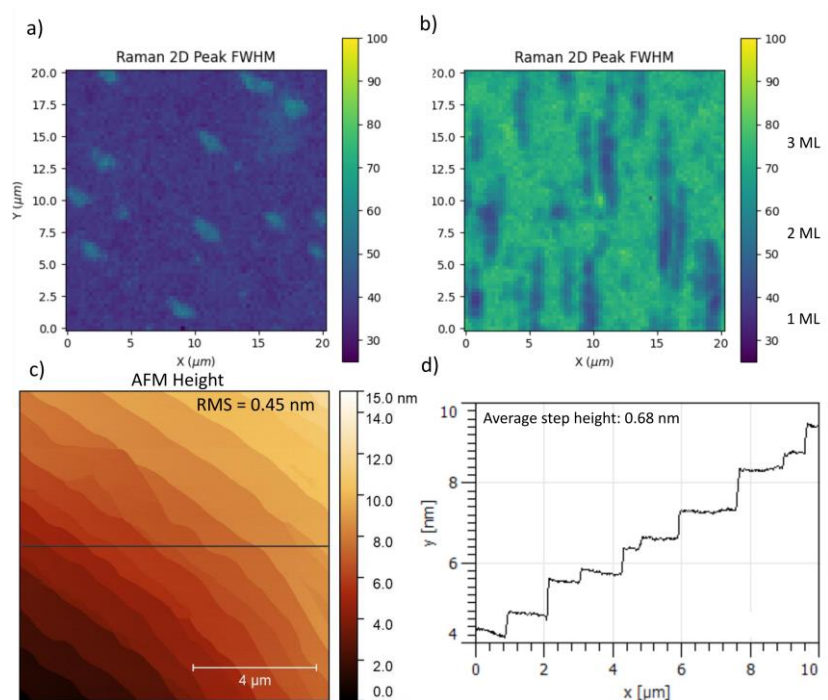


Figure 1: Raman spectral maps of optimized CVD-grown graphene 2D peak FWHM grown on a) on-axis 6H-SiC(0001) and b) 4° off-axis 4H-SiC(0001). c) An AFM height micrograph showing the stepped surface of a). d) A line profile along the black line in c), showing an average step height of 0.68 nm.

Table I: Growth parameters for remote epitaxial growths containing CVD graphene barrier layers.

ID	Growth Time (min)	C ₃ H ₈ Flow (sccm)	SiH ₄ Flow (sccm)	H ₂ Flow (slm)
A	40	5.2	500	20
B	40	2	194	20
C	40	5.2	500	50
D	5	20.6	2000	20

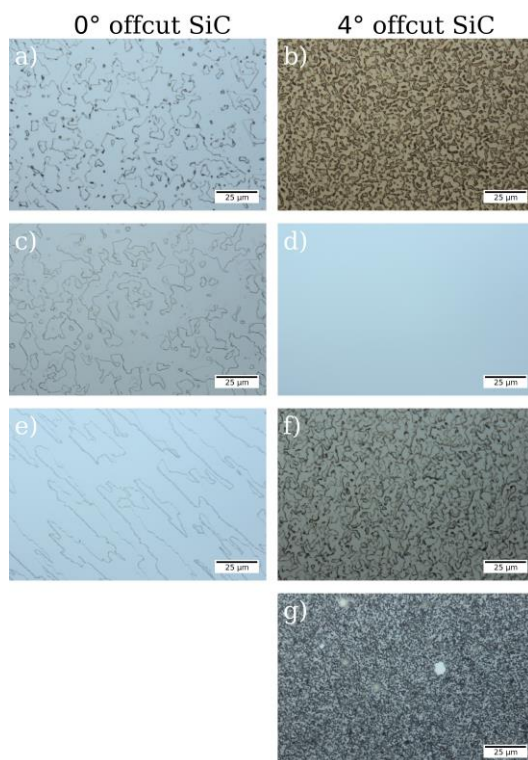


Figure 2: Nomarski micrographs of CVDG RE Growth A (a, b), B (c, d), C (e, f), and D (g) showing the surface morphology of the nominally on-axis substrate (left column) and the 4° off-axis substrate (right column). A smooth, featureless film was grown on off-axis SiC using Growth B conditions. Scale bars are 25 μm long.

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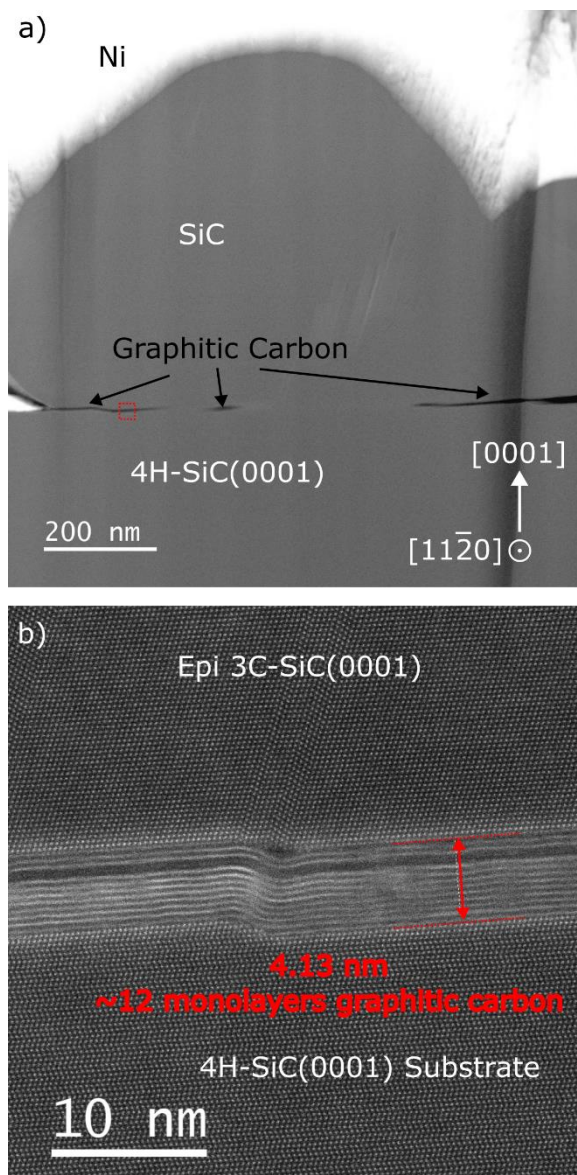


Figure 3: a) High-angle annular dark field scanning tunneling microscopy (HAADF-STEM) cross section of the SiC/graphitic carbon/4H-SiC(0001) heterostructure from Growth D. Ni was used as a protective coating on top of the SiC epilayer. b) A higher magnification medium-angle ADF-STEM image from the dashed square region in a) showing the continuous nature of the ~12 monolayers of graphitic carbon and the epitaxial alignment of the grown 3C-SiC epilayer to the 4H-SiC substrate.