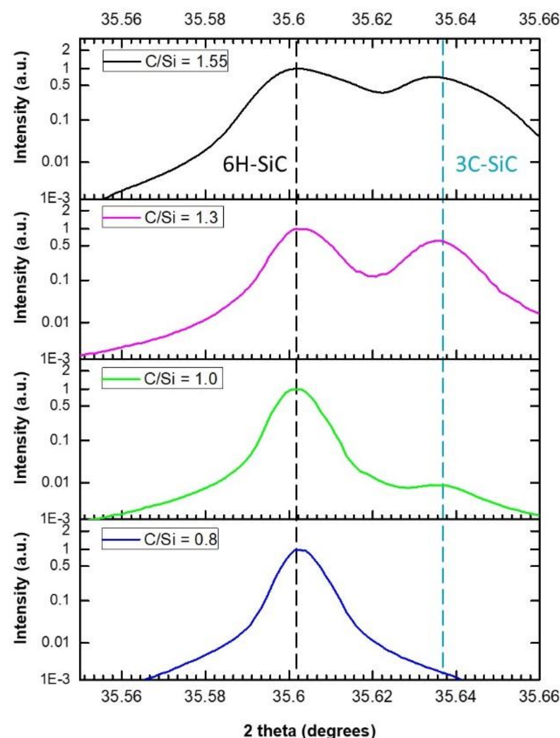

Figure 1: Rocking curve XRD of RE-grown SiC films on nominally on-axis substrates with various C/Si ratios at an Ar/H_2 ratio of 17.5/7.5 slm. The 6H (35.605°) and 3C (35.635°) SiC(0006) peak positions are highlighted by dashed black and light blue lines respectively.

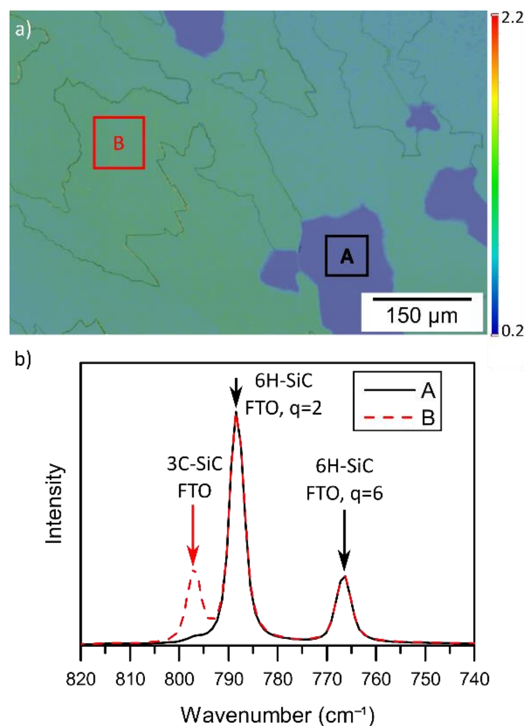

Figure 2: a) A Raman spectral map overlayed on an optical micrograph of a RE SiC film grown with a C/Si ratio of 1.55 and an $Ar:H_2$ ratio of 17.5:7.5 slm on a nominally on-axis 6H-SiC(0001) substrate. The colorbar shows the peak intensity ratio of the 3C-SiC FTO Raman mode (797 cm^{-1}) to the 6H-SiC FTO mode (767 cm^{-1}). b) Comparison of spectra from region A in a) (dashed red) to region B (solid black). Point A is representative of a 3C epilayer on a 6H substrate, while point B is representative of pure 6H-SiC.

Distribution Statement A: Approved for public release. Distribution unlimited.

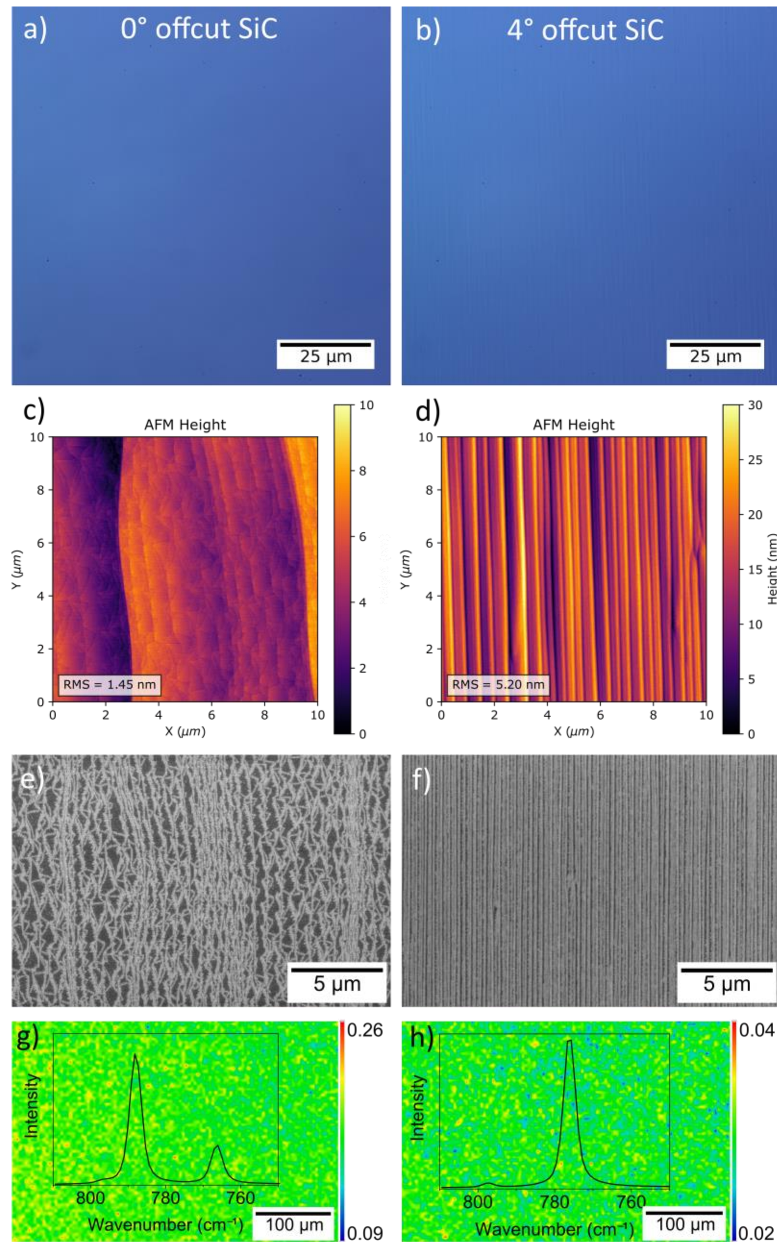

Figure 3: NIC micrographs of optimized RE SiC films grown using Ar carrier gas on a) nominally on-axis EG/6H-SiC(0001) and b) 4° off-axis EG/4H-SiC(0001). Macrostepped surface morphology can be seen in corresponding AFM height (c, d) and SEM (e, f) micrographs for the on-axis (left column) and off-axis (right column) films, respectively. Raman peak intensity ratio maps between (g) the 3C/6H polytypes on an on-axis 6H-SiC(0001) substrate and (h) the 3C/4H polytypes on a 4° off-axis 4H-SiC(0001) substrate show the films are largely uniform and polytype-pure irrespective of substrate offcut.

Distribution Statement A: Approved for public release. Distribution unlimited.