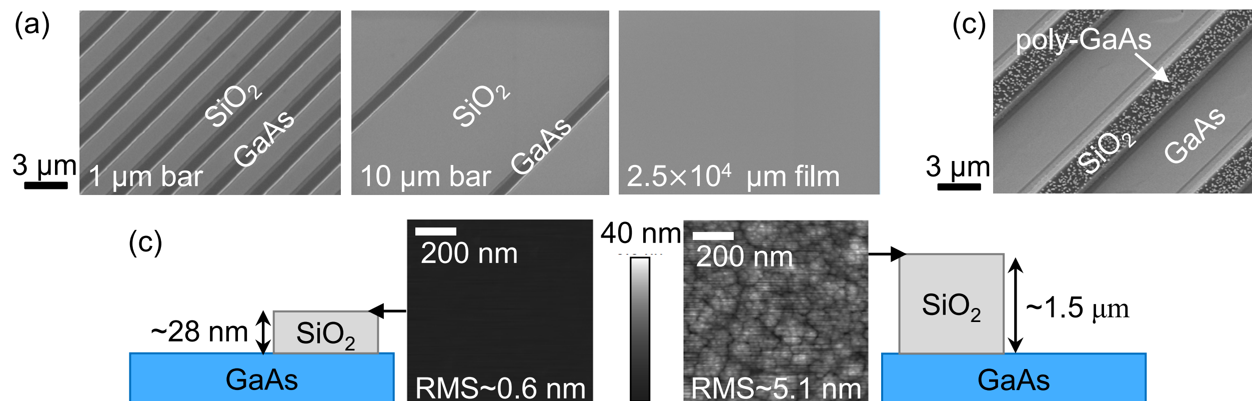

Figure 1. (a) Scanning electron microscopy (SEM) images of silica gratings and film (~28 nm height) show no polycrystal formation after 100 nm of 10% PSE growth of GaAs at 600˚C demonstrating feature-size independent selective growth. (b) Poly-GaAs formation observed on 1.5 µm tall gratings after same growth was performed. (c) Atomic force microscopy of respective SiO_2 surfaces indicates that increased roughness of 1.5 µm features promotes nucleation of poly-GaAs in this growth regime.

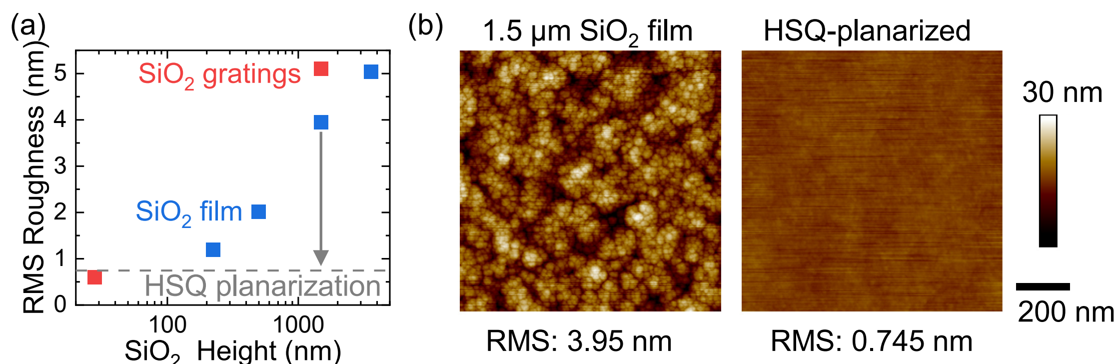

Figure 2. (a) Root-mean-square surface roughness of SiO_2 deposited by plasma-enhanced chemical vapor deposition (PECVD) compared to HSQ planarization. (b) Atomic force microscopy of a 1.5 µm SiO_2 film (left) before and (right) after planarization by 100 nm hydrogen silsesquioxane (HSQ) layer.

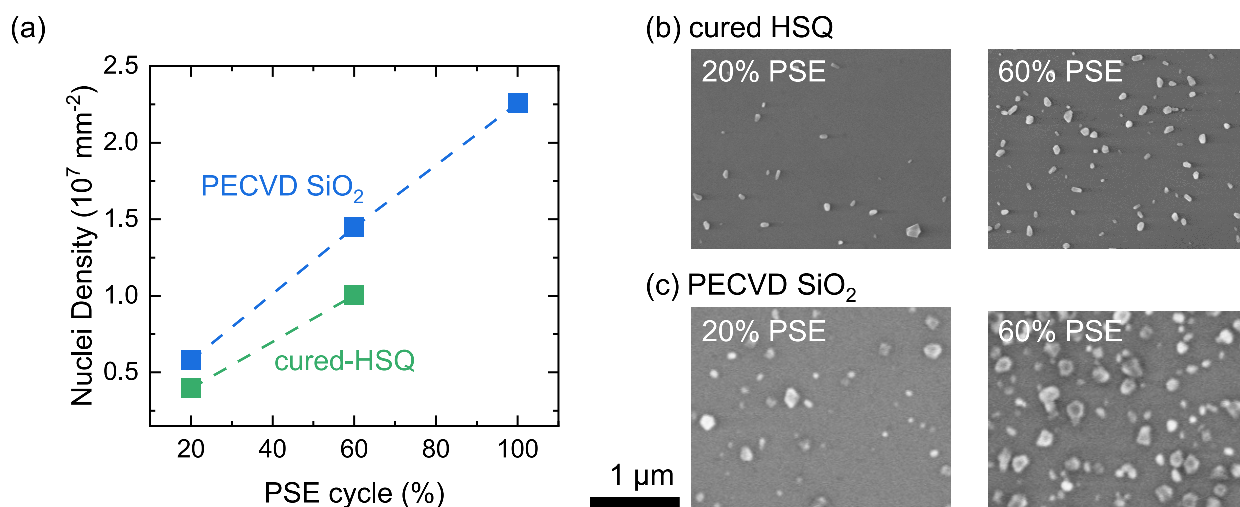

Figure 3. (a) Resulting poly-GaAs nuclei densities on cured HSQ and PECVD SiO_2 films after 100 nm GaAs was grown with varying PSE cycles (t_{cycle} = 60 s) at 600˚C. Scanning electron microscope images of poly-GaAs on (b) cured HSQ and (c) PECVD SiO_2.