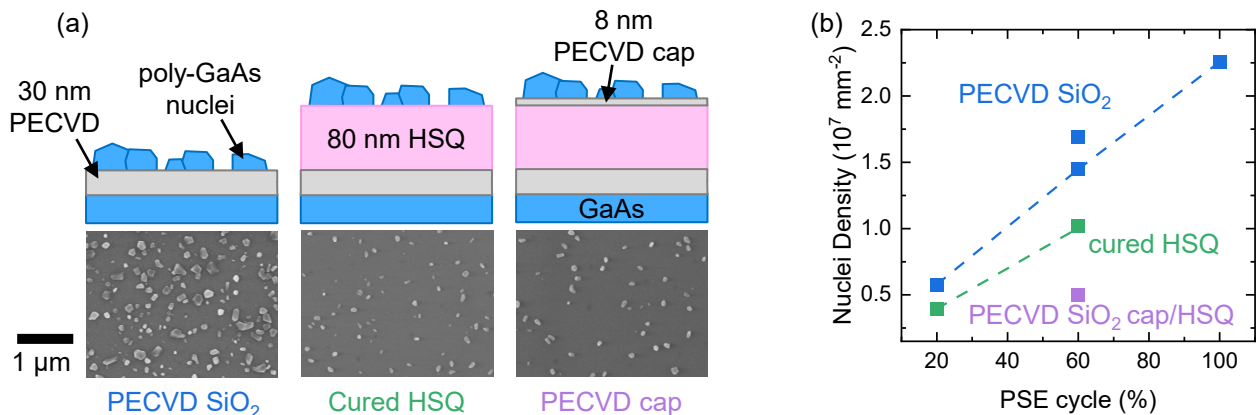
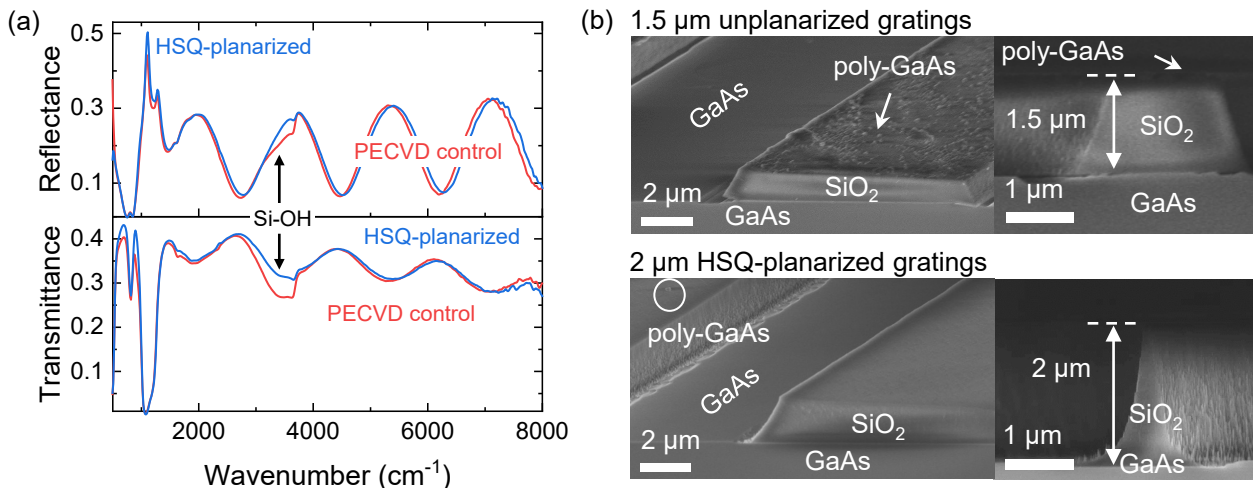


**Figure 1.** (a) Simulated reflectance of embedded high contrast grating (HCG) distributed Bragg reflector (DBR) compared to an epitaxial AlAsSb/GaSb DBR demonstrating a dramatic improvement in bandwidth. (b) Schematic of embedded HCG DBR as a backside mirror for a vertical cavity surface emitting laser.



**Figure 2.** (a) Plan-view SEM images of produced nuclei morphology for a thin  $\sim 30$  nm PECVD film, cured hydrogen silsesquioxane (HSQ) and HSQ with a PECVD cap after 100 nm GaAs PSE deposition ( $t_{\text{cycle}} = 60$ s). (b) Lower nuclei densities for HSQ structures indicate potential selectivity increase.



**Figure 3.** (a) Spectral characterization of HSQ-planarized  $2 \mu\text{m}$   $\text{SiO}_2$  film shows no degradation of optical response by HSQ planarization process. (b) Feature-independent selective growth (10% PSE,  $t_{\text{cycle}}=60$ s) of (top) unplanarized and (bottom) HSQ planarized gratings. After 100 nm of GaAs deposition, a significant decrease in polycrystalline deposition was observed on the HSQ-planarized gratings. Cross-sectional SEM images show a dramatic increase in achievable aspect ratio.