

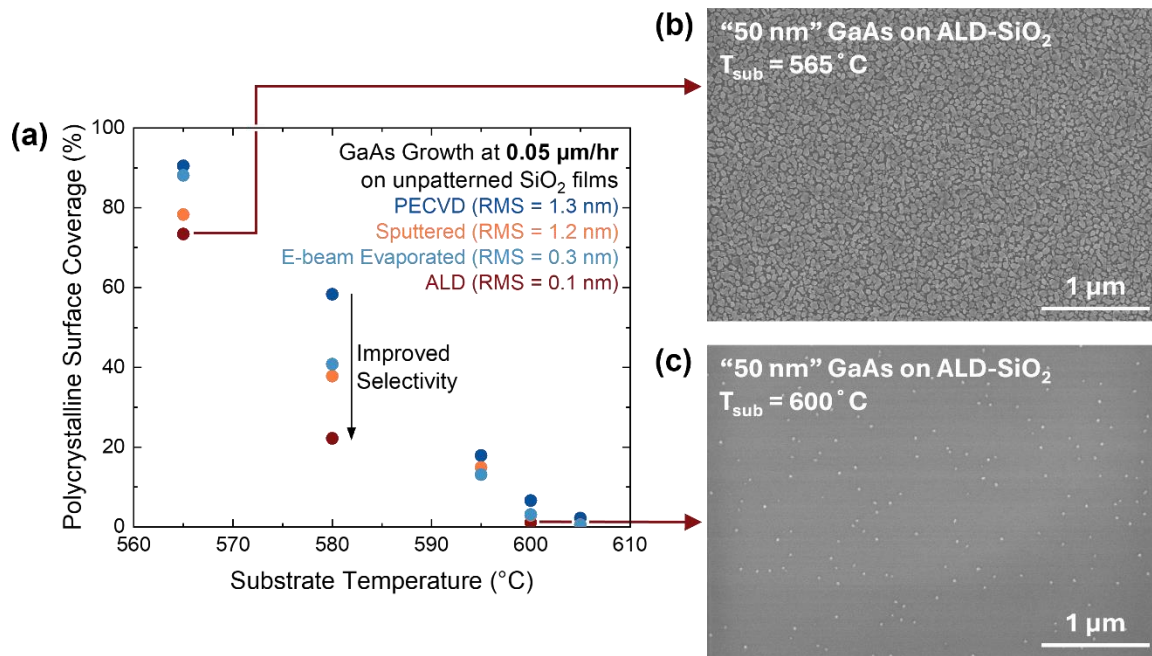


Figure 1 (a) Polycrystalline GaAs surface coverage on blanket SiO₂ films showing a dramatic decrease in surface coverage with increasing substrate temperature (indicating improved selectivity). Scanning electron micrographs highlight these regimes: (b) growth with a large degree of polycrystalline formation performed at a substrate temperature of 565°C and (c) growth with negligible adatom sticking performed at a substrate temperature of 600°C. Notably, polycrystalline formation did not simply scale with SiO₂ roughness indicating other mask properties, such as stoichiometry/density and hydrocarbon contamination, may dominate group-III sticking.

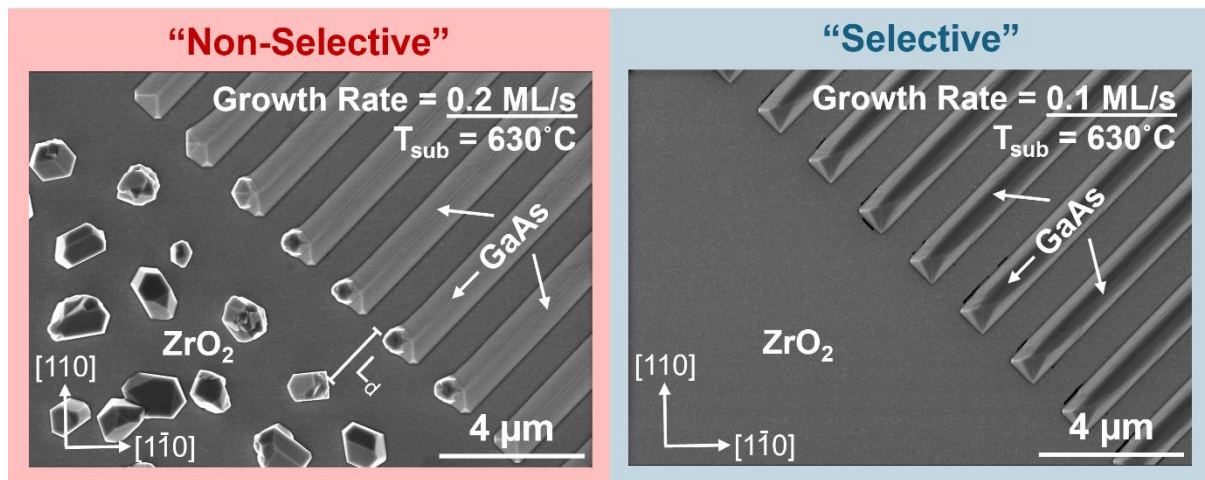


Figure 2 Planview scanning electron micrographs of GaAs grown at the edge of arrays of ZrO₂ gratings aligned to the [010] direction of GaAs. (Left) Growth performed at 0.2 ML/s enabled good selectivity with the patterned gratings, but a large amount of polycrystalline GaAs formed on the ZrO₂ mask outside of the array. (Right) By simply halving the group-III flux, growth performed at 0.1 ML/s enabled perfect selectivity over ZrO₂ features of any arbitrary size.