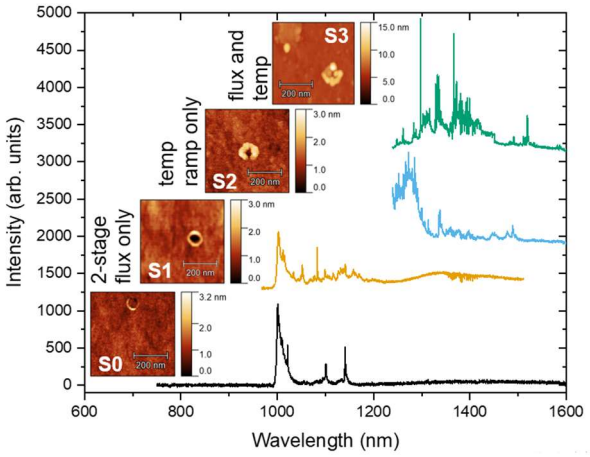

Fig S1: Photoluminescence spectra at 4 K of InAs droplet epitaxy structures with different morphologies. By varying the flux and temperature conditions during the crystallization stage of droplet epitaxy, the resulting emission is redshifted into the telecommunication wavelength ranges. Figure modified from Stevens et al. *JVSTA* **41** 032703 2023.

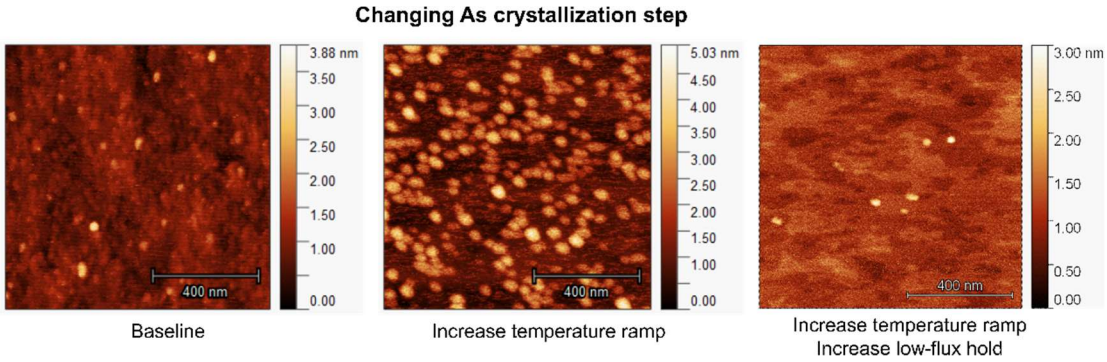

Fig S2: Atomic force microscopy images of quantum dots formed during different manipulations of the As crystallization step. Increasing the temperature ramp results in a high density of larger quantum dots. Increasing the temperature ramp and increasing the low-flux hold time reduces the quantum dot density.

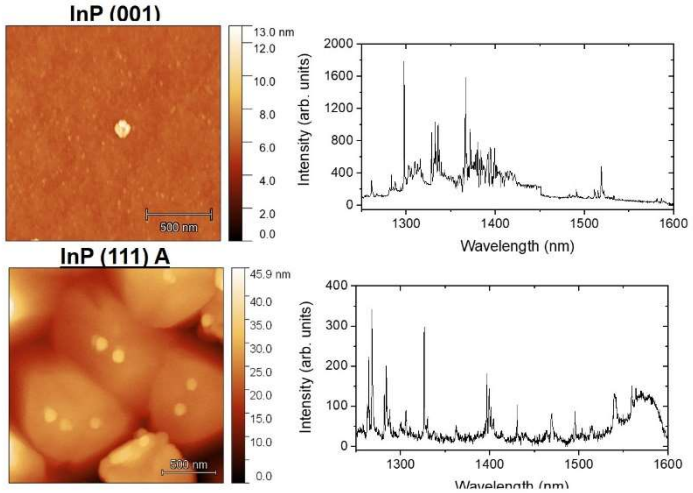

Fig S3: AFM images and PL spectroscopy of DE structures on InP (001) substrates compared to InP (111)A substrates.