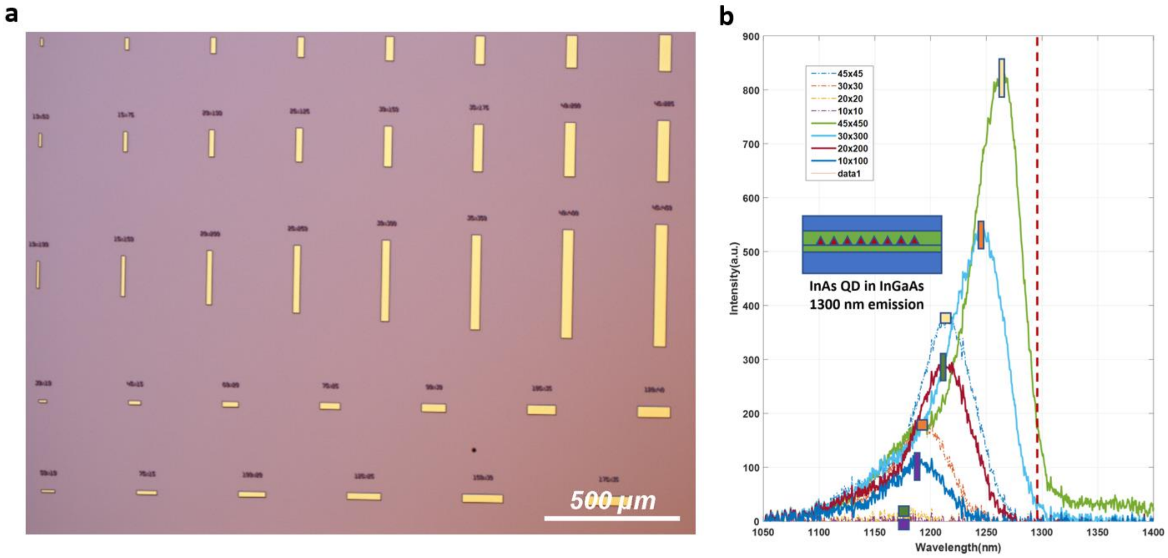


Figure 1: (a) Nomarski image of the as-fabricated oxide pattern on GaAs. The pocket size various between 45 µm × 450 µm to 1 µm × 1 µm. (b) Example room temperature PL spectra of the as-grown material. The legend is structured as "W×L" in micrometers. The red vertical dashed line indicates the emission wavelength of the QDs grown on planar GaAs.

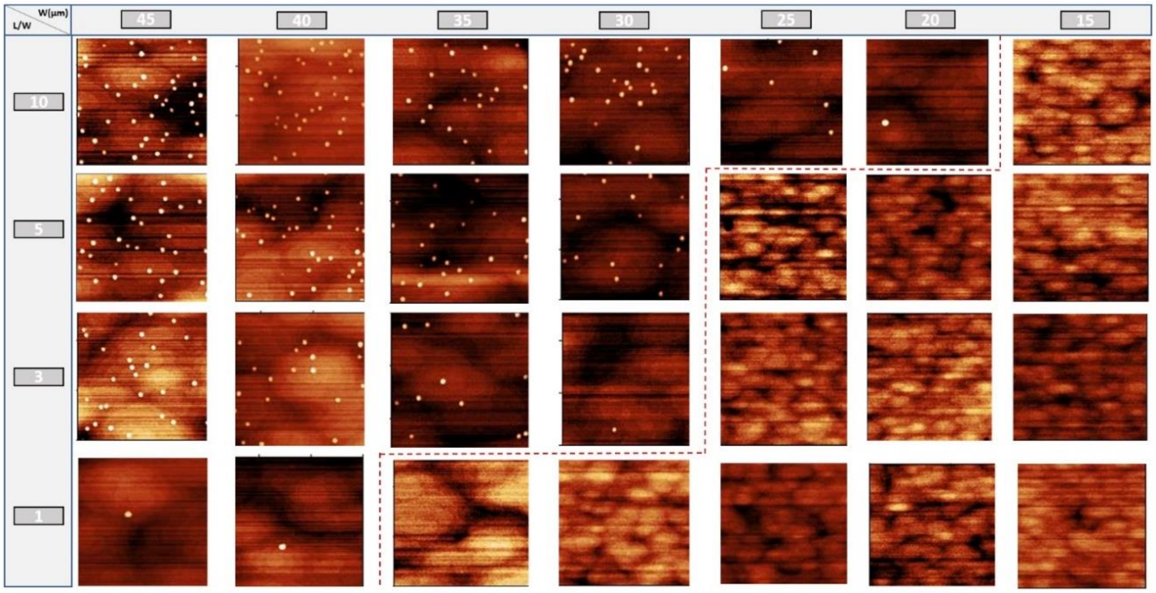
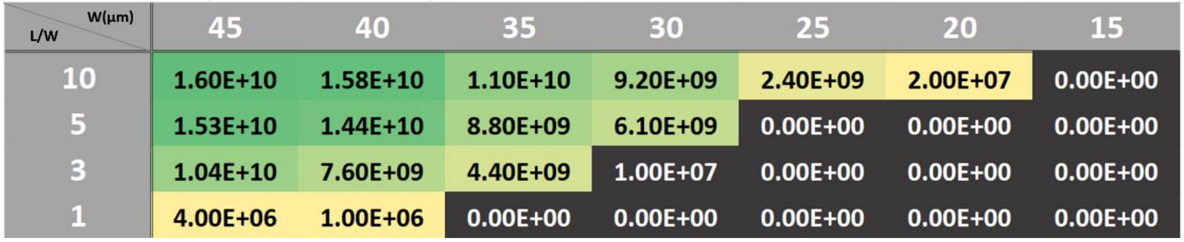


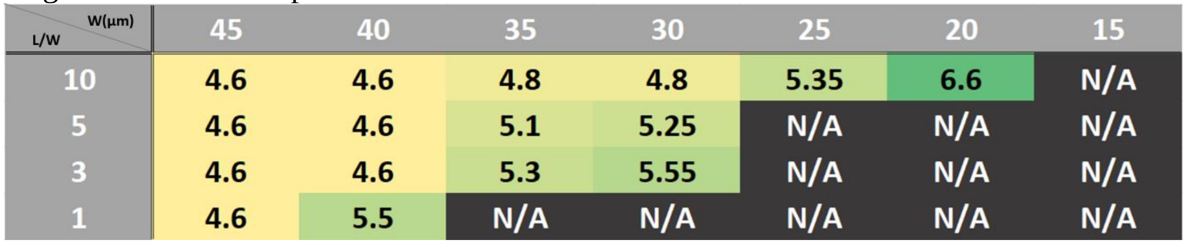
Figure 2: AFM scan of the exposed surface dots. The top roll indicates the widths of the pockets. Each AFM image shows a 500 nm × 500 nm scan area. The red dashed line indicates a "boundary" between the pocket with and without observed dots.

Table 1: QD surface density (cm^{-2}) measured in pocket with various dimensions. The reference density is approximately 5×10^{10} cm^{-2} on planar GaAs substrate



L/W \ W(μm)	45	40	35	30	25	20	15
10	1.60E+10	1.58E+10	1.10E+10	9.20E+09	2.40E+09	2.00E+07	0.00E+00
5	1.53E+10	1.44E+10	8.80E+09	6.10E+09	0.00E+00	0.00E+00	0.00E+00
3	1.04E+10	7.60E+09	4.40E+09	1.00E+07	0.00E+00	0.00E+00	0.00E+00
1	4.00E+06	1.00E+06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 2: Typical dot height (nm) measured in pocket with various dimensions. The reference height is 8 to 9 nm on planar GaAs substrate



L/W \ W(μm)	45	40	35	30	25	20	15
10	4.6	4.6	4.8	4.8	5.35	6.6	N/A
5	4.6	4.6	5.1	5.25	N/A	N/A	N/A
3	4.6	4.6	5.3	5.55	N/A	N/A	N/A
1	4.6	5.5	N/A	N/A	N/A	N/A	N/A