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Supporting Information

Dynamical evolution of Ge quantum dots on Si(111): from island formation to high temperature decay

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1) Supporting LEEM/MEM movies

Movie S1: Growth of Ge/Si QDs at a deposition temperature of 450 °C. Start voltage: 0.4 V.

Movie S2: Growth of Ge/Si QDs at a deposition temperature of 550 °C. Start voltage: 0.1 V.

Movie S3: Growth of Ge/Si QDs at a deposition temperature of 600 °C. Start voltage: 0 V.

Movie S4: Annealing of Ge/Si QDs prepared at a deposition temperature of 450 °C. Start voltage: 7.2 V.

Movie S5: Annealing of Ge/Si QDs prepared at a deposition temperature of 550 °C. Start voltage: 0.1 V.

Movie S6: Annealing of Ge/Si QDs prepared at a deposition temperature of 600 °C. Start voltage: 0.2 V.

2) QD number density with deposition time

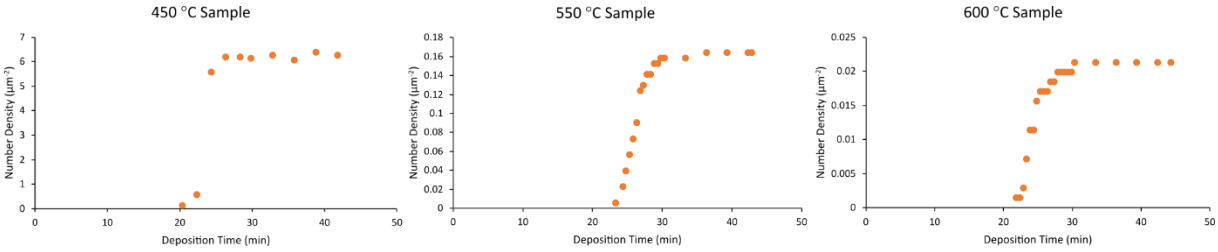

Figure S1: Change in QD number density with deposition time at 450 °C, 550 °C and 600 °C.

3) LEEM images

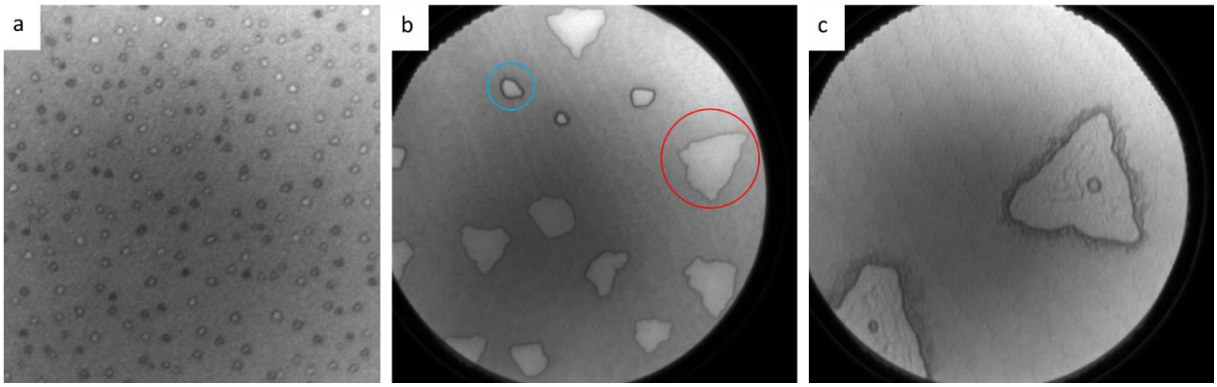

Figure S2: Ge/Si QDs obtained after the end of the deposition. Overall, the LEEM images show similar features to those obtained at lower start voltages in the LEEM/MEM regime. (a) Ge/Si QDs formed at 450 °C. Compared to **Figure 1a** in the main text**,** this image shows a wider range in the brightness of the QDs. Image dimensions: 6 × 6 µm^2. Start voltage: 9.7 V. (b) Ge/Si QDs formed at 550 °C. Similar to **Figure 1b**, there are two different types of islands: large, flat ones (red circle) and small, faceted ones (blue circle), as evident from their size and contrast at the edge of the islands. Image field of view: 10 µm. Start voltage: 7.96 V. (c) Ge/Si QDs formed at 600 °C. Image field of view: 5 µm. Start voltage: 8.55 V.

4) Annealing temperature with time

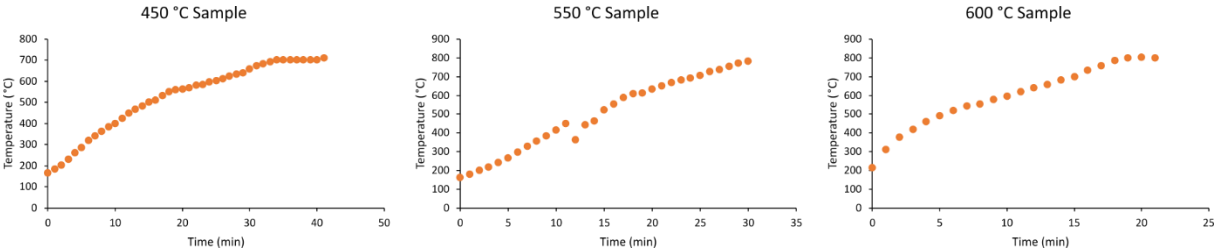

Figure S3: Surface temperature during annealing experiments of the samples grown at 450 °C, 550 °C and 600 °C.