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Wavelength tunable high quality positioned InAs quantum dots grown on patterned GaAs (001) substrates AYESHA JAMIL, University of Cambridge, JOANNA SKIBA-SZYMANSKA, Toshiba Research Europe Ltd., IAN FARRER, University of Cambridge, MARTIN WARD, Toshiba Research Europe Ltd., JONATHAN GRIFFITHS, GEB JONES, University of Cambridge, ANDREW SHIELDS, Toshiba Research Europe Ltd., DAVE RITCHIE, University of Cambridge, TOSHIBA RESEARCH EUROPE LTD. COLLABORATION — Semiconductor quantum dots serve as ideal contenders in the domains of quantum optics, quantum cryptography and quantum information processing. The decisive factor about their possible applications is their peak emission energy. Naturally grown quantum dots suffer from the problem of random nucleation behavior and non-uniform dot sizes. Here we report on the growth of site-controlled InAs quantum dots on pre-patterned GaAs(001) substrates with adjustable wavelengths. Interplay of the dot growth parameters, particularly growth temperature and Indium deposition amount, as well as the size of the initial template has been employed. With a 20 nm thick GaAs spacer layer grown between the regrowth interface and the quantum dot layer, uniform arrays of quantum dots have been achieved with emission wavelengths covering a spectral window ranging from 900 nm to 1200 nm. This has been achieved without risking the single dot occupancy per nucleation site measured to be $> 60\%$ for all of the investigated samples. To ensure better quality of dots, wafer cleanliness is monitored throughout the process. The dots thus show bright emission lines with no spectral jittering.

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