

Interdiffusion Techniques for Quantum Dot Photonic Integrated Circuits - P. Lever, L. Fu, M. Buda, H.H. Tan, and C. Jagadish (The Australian National University)

The thermal stability of a 3-layer stacked InGaAs quantum dot structure was investigated. It was found that the thermally-induced interdiffusion was a large effect due to the high accumulated strain energy of the system. By using GaP as a strain compensation layer, the thermal stability of the quantum dots could be enhanced. Ion implantation and SiO₂ capping layer followed by annealing were shown to introduce additional energy shift of the quantum dots while TiO₂ cap suppressed the thermally-induced interdiffusion to some extent. The differential energy shifts obtained by using these techniques offers great potential for the fabrication of quantum dot photonic integrated circuits.