GAASSB/INGAAS SELF ASSEMBLED QUANTUM DOTS WITH ROOM TEMPERATURE EMISSION IN THE 1.5 –1.7 MM RANGE

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In the last few years there has been a strong interest in expanding the usable wavelength range of GaAs based optoelectronic devices towards 1.55 µm, and most progress has been achieved through self assembly of epitaxial nanoestructures. Room temperature photoluminescence at 1.5 – 1.7 µm is demonstrated from InGaAs quantum dots capped with an 8 nm GaAsSb quantum well. Results obtained from various sample structures are compared, including samples capped with GaAs. Capping of InAs QDs with pure GaSb has also been studied, resulting in high intensity room temperature photoluminescence at 1.3 µm. The photoluminescence data suggests separate confinement for electrons and holes in these nanostructures, and type II spatially indirect recombination. The observed redshift in samples capped with Sb is attributed mostly to a beneficial modification of growth kinetics, apparently preventing the common self-disassembly of the dots during the initial stages of capping. The sample structure is discussed on the basis of transmission electron microscopy results and *in situ* Reflection High Energy Electron Diffraction.