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Microanalysis of quantum dots with type II band alignments WENDY SARNEY, JOHN LITTLE, STEFAN SVENSSON, US Army Research Laboratory — We will discuss the structural characterization of a system consisting of undoped self-assembled InSb quantum dots having a type II band alignment with the surrounding $In_{0.53}Ga_{0.47}As$ matrix. This differs from systems using conventional type-I quantum dots that must be doped and that rely on intersubband transitions for infrared photoresponse. Type II dots grown in a superlattice structure combine the advantages of quantum dots (3-dimensional confinement) with the tunability and photovoltaic operation of the type II superlattice. We grew a high surface density of InSb quantum dots with a narrow distribution of sizes and shapes and free of dislocations within the body of the dots. The dots are relaxed due to an array of misfit dislocations confined at the basal dot/matrix interface. This makes burying the dots with InGaAs not feasible without generating dislocations due to the large dot/matrix lattice mismatch. We are experimenting with strain-compensating or graded strain overlayers to lower the lattice mismatch.

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