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Near infrared intersubband transitions in delta-doped InAs/AlSb multi-quantum wells SHIGEHICO SASA, YOJI NAKAJIMA, MASATO NAKAI, MASASHI FURUKAWA, MASATAKA INOUE, Osaka Institute of Technology, DIANE LARRABEE, JUN-ICHIRO KONO, Rice University — Intersubband transitions (ISBTs) in Si doped narrow InAs/AlSb multiple quantum wells (MQWs) were investigated for well widths, d , ranging from 5 nm down to 1.8 nm with 10, 20 or 60 periods. As the well width decreased, the ISBT signal of the MQWs decreased. However, it persisted down to $d = 2.1$ nm with a sheet doping density in each quantum well of $9 \times 10^{12} \text{ cm}^{-2}$ and 60 periods. The ISBT signal observed for $d = 2.1$ nm was peaked at an energy of 670 meV at 77K. A large linewidth increase was also observed for the narrowest wells ($d \leq 3$ nm). In order to study the origin of the linewidth broadening, we measured the electron mobility of the samples and found that the mobility showed d^6 dependence for $d \leq 3$ nm. We show that the linewidth broadening is well explained by the reduction in the mean free time as the well width decreased.

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