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Photoluminescence of surface InAs quantum layer on GaAs(001) and the carrier dynamics[1] ITARU KAMIYA, KOSEI FUKUI, Toyota Technological Institute — The opto-electronic properties of self-assembled quantum dots (QDs) grown by epitaxial crystal growth, for instance InAs/GaAs(001) by MBE, have attracted great attention during the past few decades. Recently, there have been a number of reports on the properties of surface InAs QDs, where the QDs are not capped by GaAs and instead exposed to ambient, since such structure exhibits luminescence in the 1.5 micron regime. The growth of such QDs accompanies formation of a wetting layer (WL) which is typically a monolayer thick film of InAs. However, in the studies on InAs QDs, the contribution of the WL is often neglected, if not, not distinguished from those of the QDs. However, we find that surface WL exhibits unique properties, also providing information for better understanding those of the QDs. Here, using PL and PLE, we studied surface InAs WL and QDs grown on GaAs(001). We show that signals arising from the WL and QDs can be distinguished, and that they exhibit properties different from those of buried structures. Based on these results, we discuss the carrier dynamics in the near surface regime.

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