

【TP-04】

Bandgap Engineering of self-assembled InAs quantum dots with a thin AlAs barrier

정순일, 윤진주, 이제원, 조관식, 전민현, 임재영, 이동률*, 김종수**, 손정식***, 반승일+, 이창명+,
조은태+, 이주인+, 김진수++
인제대학교 나노공학과, *영남대학교 물리학과, **Nanomaterials Lab., NIMS, Japan, ***경원대학교
안경공학과, +한국표준과학연구원 나노표면 그룹,
++한국전자통신연구원 광통신소자연구부

Three different InAs quantum dots (QDs) structures were grown to investigate the effects of a thin AlAs layer with different position and thickness on the optical properties of InAs QDs by photoluminescence (PL). In addition, typical InAs QD structure, InAs/GaAs, was grown as a reference. The PL peak position of InAs QDs directly grown on 4 monolayer (ML) AlAs layer is blueshifted by 220 meV from that of reference sample, just by inserting 4 ML of the AlAs layer. InAs QDs directly grown on 2 ML AlAs layer is decrease in full width at half maximum (FWHM) from 42 to 34 meV for ground state without varied peak position. Also the PL peak of InAs QDs grown among thick AlAs layer (20nm) is violently blueshifted to higher energy from that of reference sample by 517meV with increase in FWHM from 42 to 94 meV. In conclusions, the optical properties of InAs QDs were systematically controlled by using a thin AlAs layer.