

MBE Growth and Investigate Optical Properties of Mg-Doped GaAs Epitaxial Layer

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To investigate the optical properties of Mg doped GaAs grown by molecular beam epitaxy (MBE) with various growth temperatures, photoluminescence (PL) measurements were carried out. As changing the growth temperature, the carrier concentration are changed from 6.6×10^{16} to 1.5×10^{18} cm^{-3} . In sample which carrier concentration is 2.3×10^{17} cm^{-3} , we observe four dominant PL emissions emitted from free-to bound transitions (e-A), exciton bound to neutral acceptor (A^0X), and two kinds of acceptor associated emission (g, g-g). Temperature dependence of PL measurements were carried out from 45 to 160 K to study the each peak behavior with changing temperature. The A^0X peak position follows GaAs Varshni model with increasing temperature. In g and A^0X peaks, an increase in the PL intensity with the increase of temperature is observed in the temperature range from 45 to 50 K and this phenomenon is known as “negative thermal quenching (NTQ)”. The NTQ in g peak is observed.