

A Study on photoluminescence of ZnSe/GaAs epilayer

*Changsun Park, **Kwangjoon Hong

*Department of metallurgical and Material Science Engineering,
Chosun University, Kwangju, 501-759, Korea

** Department of Physics, Chosun University, Kwangju 501-759,

The ZnSe epilayers were grown on the GaAs substrate by hot wall epitaxy. After the ZnSe epilayers treated in the vacuum-, Zn-, and Se-atmosphere, respectively, the defects of the epilayer were investigated by means of the low-temperature photoluminescence measurement. The dominant peaks at 2.7988 eV and 2.7937 eV obtained from the PL spectrum of the as-grown ZnSe epilayer were found to be consistent with the upper and the lower polariton peak of the exciton, I_2 (D^0 , X), bounded to the neutral donor associated with the Se-vacancy. This donor-impurity binding energy was calculated to be 25.3 meV. The exciton peak, I_1^d , at 2.7812 eV was confirmed to be bound to the neutral acceptor corresponded with the Zn-vacancy. The I_1^d peak was dominantly observed in the ZnSe/GaAs:Se epilayer treated in the Se-atmosphere. This Se-atmosphere treatment may convert the ZnSe/GaAs:Se epilayer into the p-type. The SA peak was found to be related to a complex donor like a $(V_{Se} - V_{Zn}) - V_{Zn}$.

Keywords: ZnSe; hot wall epitaxy; annealing treatment; defect; photoluminescence