(초청강연) I5

ZnSe의 유기 금속 화학 박막 증착
(Organometallic Vapor Phase Epitaxy of ZnSe)

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The growth and nitrogen doping of ZnSe by low pressure organometallic vapor phase phase epitaxy(OMVPE) have been investigated in a vertical downflow reactor equipped with a laser interferometer for in-situ growth rate measurements, and a microwave plasma cavity for precracking of ammonia for nitrogen doping. Particular emphasis is placed on understanding growth characteristics obtained with H_2Se and the new adduct source dimethylzinc:triethylamine(DMZn:NEt_3), as compared to those obtained with H_2Se and DMZn. At higher temperatures and pressures, growth results obtained with DMZn:NEt_3 are similiar to those obtained using DMZn with the morphology exhibiting familiar hillock-shaped features. At lower temperatures (<300℃) and pressures (<30 Torr), growth rates are higher with the adduct source and the surface morphology is improved relative to films synthesized with DMZn. Hall Measurements and photoluminescence spectra of the grown films demonstrate that DMZn and DMZn :NEt_3 produce materials with comparable electronic and optical properties. Microwave plasma decomposition of ammonia is investigated as a possible approach to increasing nitrogen incorporation in ZnSe and photoluminescence spectra are compared to those realized with conventional ammonia doping.

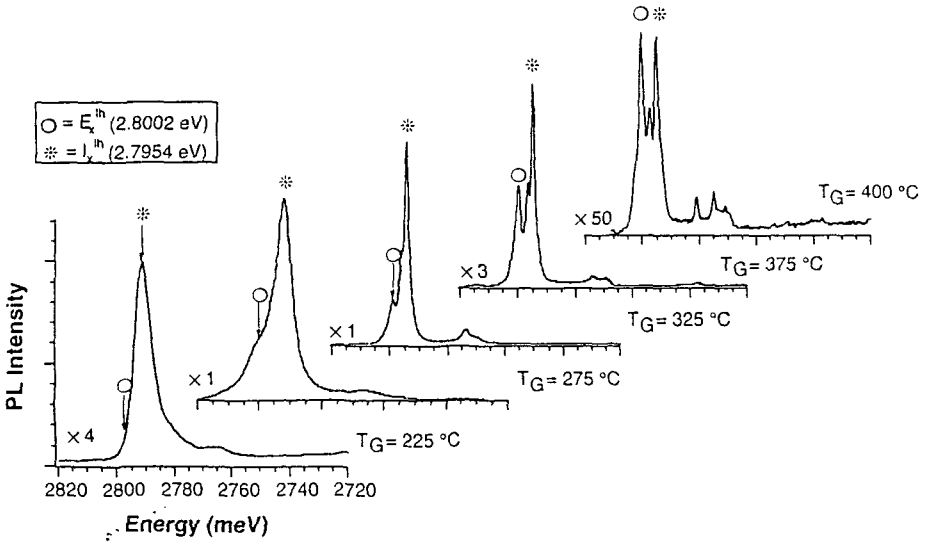

Figure Variation in near-band-edge photoluminescence spectra of ZnSe films with deposition temperature. E_x^{lh} :O; I_x^{lh} :*. Films deposited with H_2Se and DMZn:NEt_3 at 30 Torr and VI/II=10

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