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펄스 레이저 증착법에 의한 ZnO: Li 박막의 광전류 특성

Photocurrent properties for ZnO: Li Thin Film Grown by Pulesd Laser Deposition

홍광준†, 김현, 방진주, 강종욱, 공종식, 정준우

조선대학교 물리학과

(kjhong@mail chosun ac kr†)

ZnO Li epilayers were synthesized on sapphire substrate by the pulesd laser deposition (PLD) after the surface of the ZnO Li sintered pellet was irradiated by the ArF (193nm) excimer laser The growth temperature was oxidated at 400 oC The crystalline structure of epilayers was investigated by the photoluminescence (PL) and double crystal X-ray diffraction (DCXD) The carrier density and mobility of epilayers measured by van der Pauw-Hall method are 2 69 x 10 cm-3 and 52 137 cm2/V s at 293K, respectively The temperature dependence of the energy band gap of epilayers obtained from the absorption spectra is well described by the Varshni's relation, Eg(T) = 3 5128 eV - (9 51 × 10-4 eV/K)T2/(T + 280K) The crystal field and the spin-orbit splitting energies for the valence band of the ZnO· Li have been estimated to be 0 0023 eV and 0.0248 eV at 10 K, respectively, by means of the photocurrent spectra and the Hopfield quasicubic model These results indicate that the splitting of the Δso definitely exists in the Γ6 states of the valence band of the ZnO· Li. The three photocurrent peaks observed at 10K are ascribed to the A1-, B1-, and C1-exciton peaks for n = 1.