Supporting Information

Exciton localization of high quality $ZnO/Mg_xZn_{1-x}O$ multiple quantum wells on Si (111) with a Y_2O_3 buffer layer

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This PDF file includes:

• Supporting Figures S1–S5

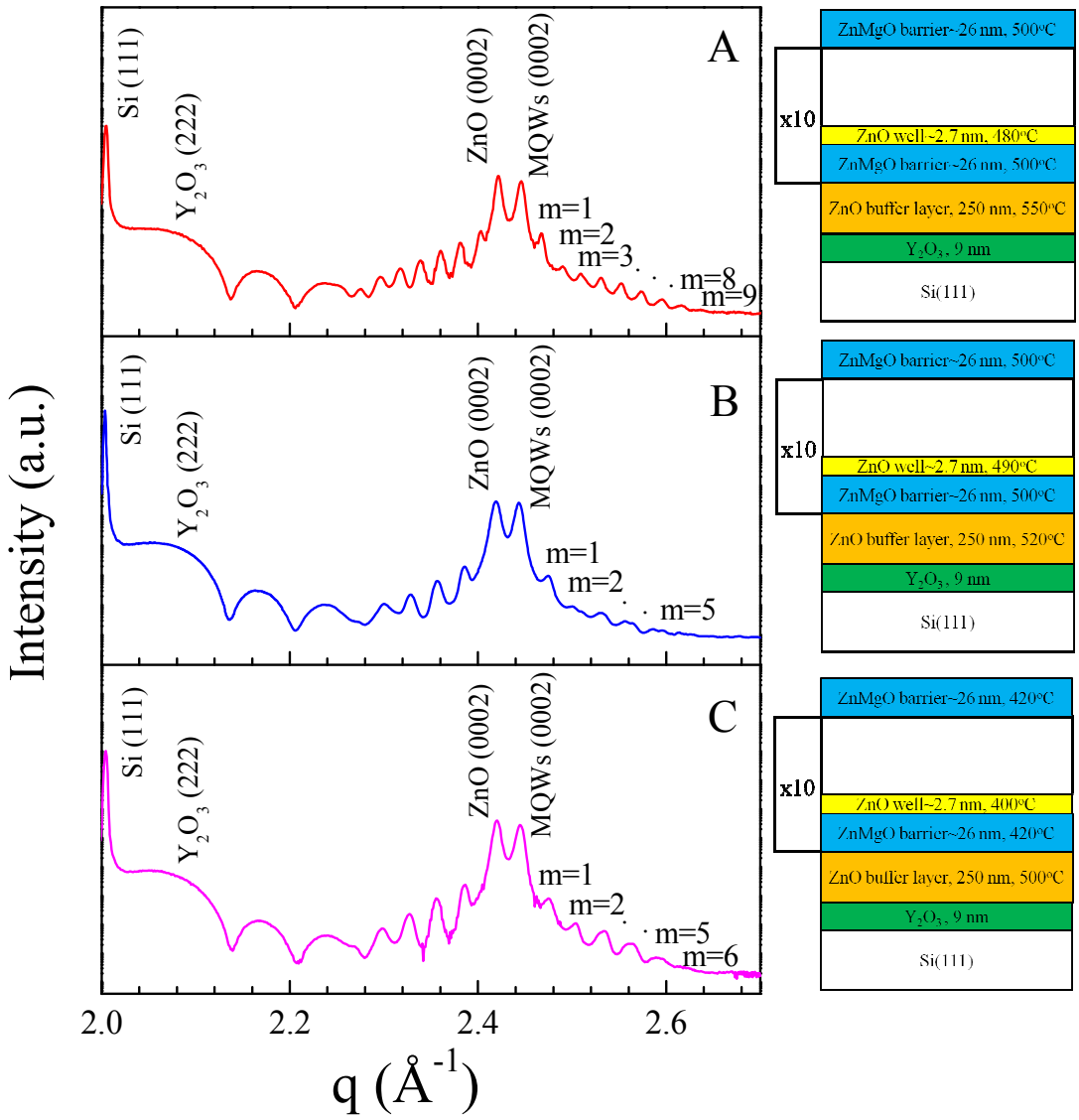


Figure S1. A set of XRD radial scans along surface normal for the samples A, B, and C of L_w=2.7nm, which were grown at different temperatures in chronological order and the other growth parameters are the same.

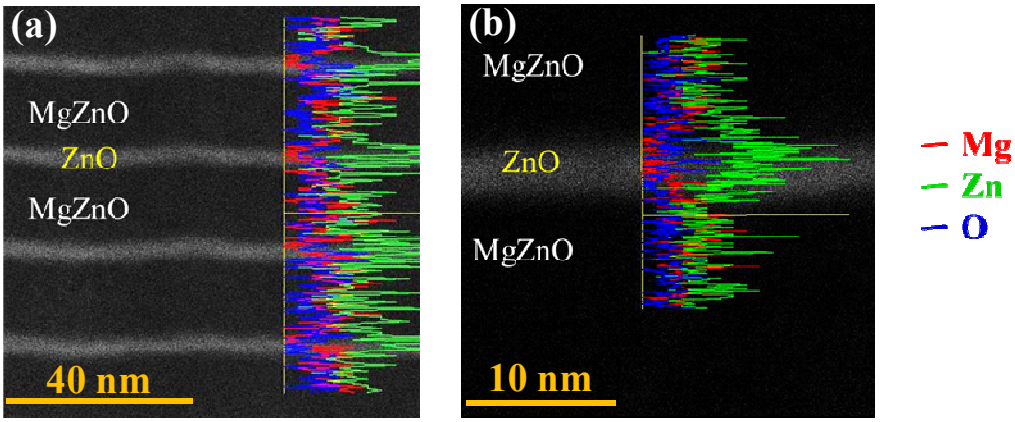


Figure S2. The HAADF STEM images combined with EDX microanalysis.

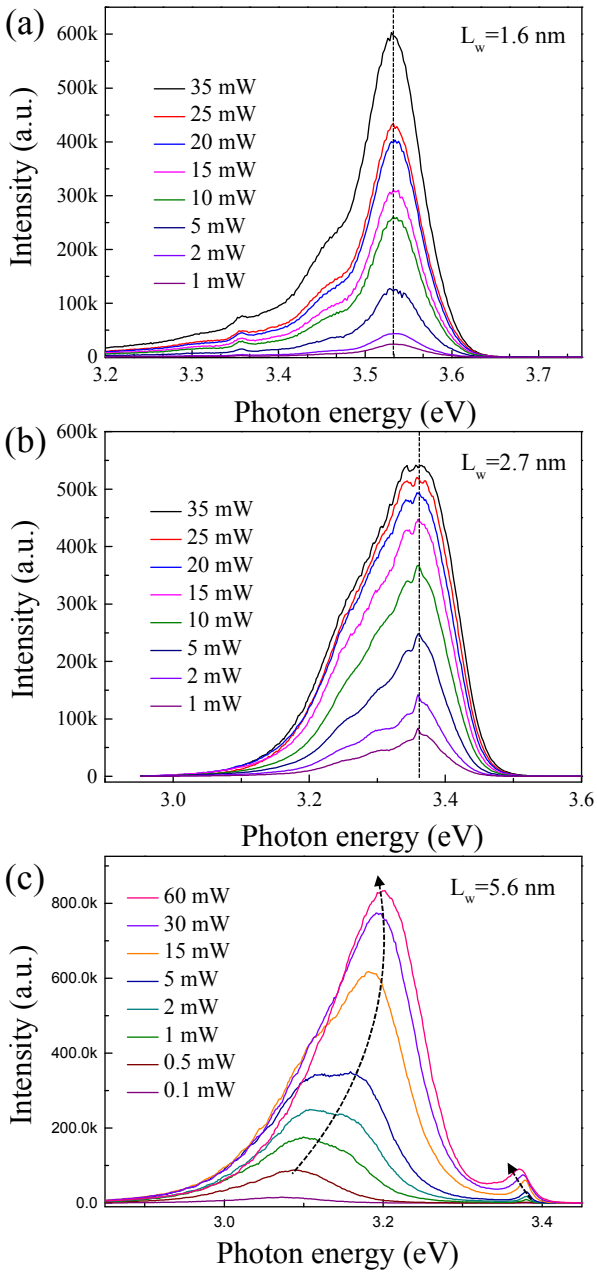
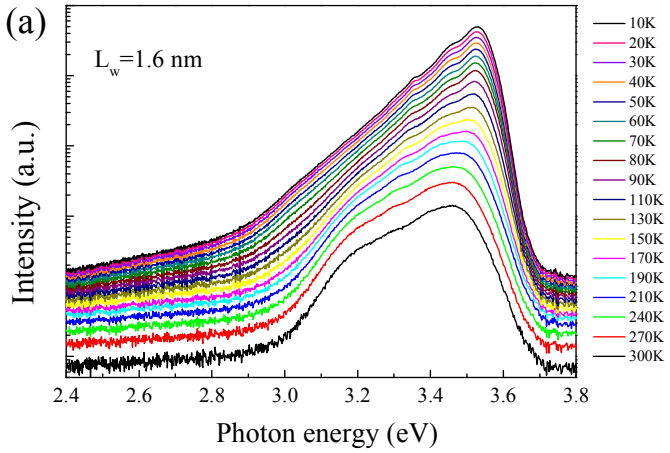
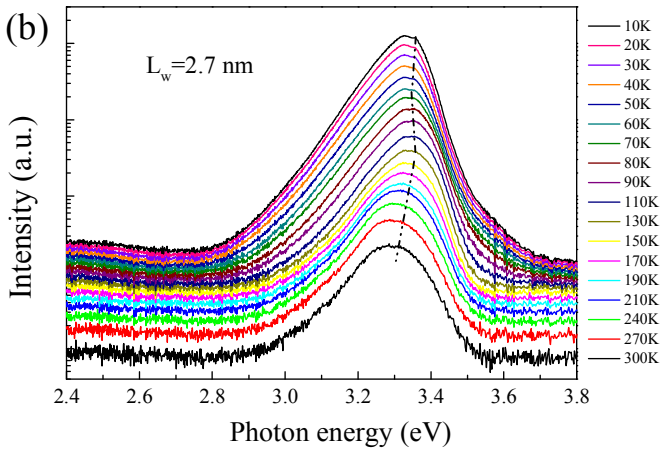
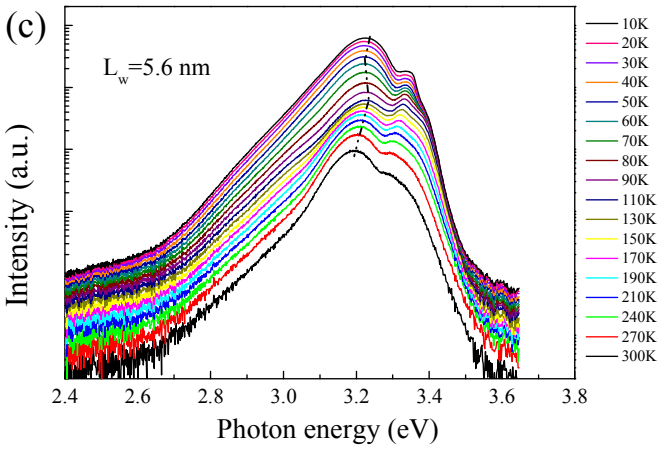


Figure S3. Excitation power-dependent PL spectra of ZnO/ZnMgO MQWs with (a) L_w= 1.6, (b) L_w= 2.7, and (c) L_w= 5.6 nm measured at 10K. The emission peak at ~3.37eV is assigned to the free exction of ZnO buffer







layer.

Figure S4. Temperature dependent PL spectra of the MQWs sample with (a) L_w= 1.6, (b) L_w= 2.7, and (c) L_w= 5.6 nm.

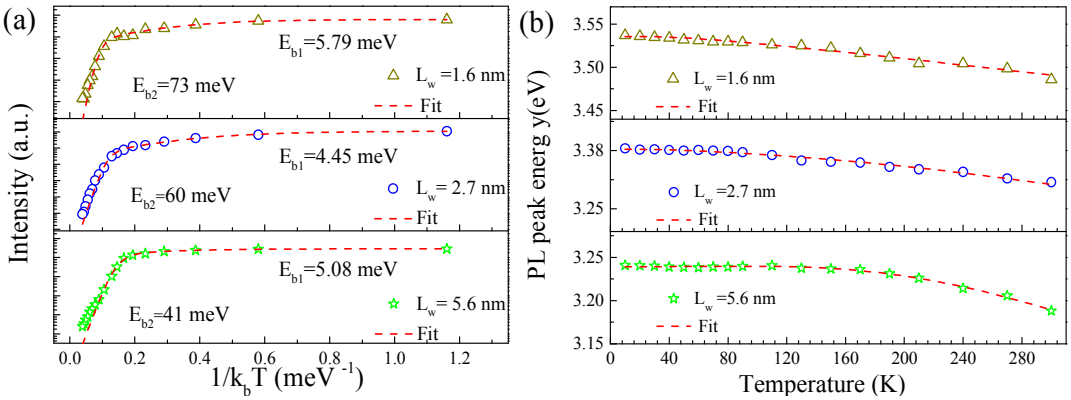


Figure S5. (a) The integrated intensity of the NBE emission of ZnO/ZnMgO MQWs with L_w= 1.6, 2.7, and 5.6 nm as function of inverse temperature. The dash lines correspond to least-squares fits from Eq. 1. The activation energies of E_{b1} and E_{b2} are determined, as labeled in (a). (b) The temperature-dependent excitonic emission peak of ZnO/ZnMgO MQWs with L_w= 1.6, 2.7, and 5.6 nm as function of temperature, respectively. The dash lines correspond to least-squares fits from Eq. 2.