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Growth of ZnO/Zn_{1-x}Mg_xO multilayer thin films by pulsed laser ablation TOSHIHIKO MAEMOTO, NOBUYASU ICHIBA, SHIGEHICO SASA, MASATAKA INOUE, New Materials Research Center, Osaka Institute of Technology — ZnO/Zn_{1-x}Mg_xO multilayer thin films were grown on a-plane Al₂O₃ substrates at 400 °C by pulsed laser ablation. Multilayer films were grown by stacking alternate layers of ZnO and ZnMgO with equal thickness varying from 2 to 8 nm. These films were characterized by x-ray diffraction, cathodeluminescence, and photoluminescence measurements. ZnO/Zn_{0.9}Mg_{0.1}O multilayer films showed a clear six-fold symmetry without in-plane rotational domains from pole-figures of X-ray diffraction. Decreasing the thickness of both ZnO and ZnMgO layers affected the band gap energy and optical properties. In particular, the band gap energy increased continuously with decreasing thickness of the ZnO and ZnMgO layers. A ZnO/MgO film was also grown by sequentially stacking ZnO and MgO layers and the resulting band gap energy was about 3.8 eV.

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