

Abstract Submitted
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Chemical activity of oxygen atoms in the growth of sputter-deposited ZnO films HAJIME SHIRAI, AYA MORITA, Saitama University, SHIRAI TEAM — The role of oxygen atoms in the growth of magnetron sputter-deposited ZnO films was studied by alternating the deposition of a several-nanometer-thick ZnO layer and the O₂/Ar mixture plasma exposure, i.e., *layer-by-layer* (LbL) technique. The film crystallization promoted with suppressing the oxygen vacancy and interstitial defects by adjusting the exposure condition of O₂/Ar plasma. These findings suggest that the chemical potential of oxygen atom determine the film crystallization as well as the electronic state. The diffusion and effusion of oxygen atoms at the growing surface play a role of thermal annealing, promoted the film crystallization as well as the creation and the annihilation of oxygen and zinc related defects. The role of oxygen atoms reaching at the film-growing surface is discussed in term of *chemical annealing*. The possible oxygen diffusion mechanism is proposed.

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