

Abstract Submitted
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Production of stable Zn-O₂ mixture plasma for ZnO transparent conductive film NAOYUKI SATO, TAKASHI IKEHATA, Ibaraki University — Our goal is to construct the multi-ion-plating method by arraying each PC controlled point source for the large-area fast coating of the oxide materials. One point source introducing Zn vapor to O₂ ICP (Inductively Coupled Plasma) is relatively controlled well over the sheet resistance R_s of 10 ops (ohm/square) order for ZnO transparent conductive film, however, at 1 ops order there is crucial problem for the poor reproducibility including of the thin film peeling-off. To overcome it, we look for the more optimum synthesis condition by moving continuously the ICP coil and the Zn oven with respect to the substrate position during the deposition. This configuration can vary the excited state for Zn, O, O₂ and their amount, resulting in the extension of control window to be able to draw much lower R_s . After we consider the life-time of the excited particles, their mean-free-paths, and the coil induced electric-field between the oven top and the film growth surface, we can set the adequate position-relation to obtain the excellent opto-electrical property of ZnO thin film at high deposition rate over 1000 nm/min. We report how to generate the mixture plasma stably and the improvement state to elevate the appearance of 1 ops order film with keeping the visible-NIR transparency.

Naoyuki Sato
Ibaraki University

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