

Abstract Submitted
for the GEC15 Meeting of
The American Physical Society

Plasma-Assisted Mist Chemical Vapor Deposition of Zinc Oxide Films for Flexible Electronics¹ KOSUKE TAKENAKA, GIICHIRO UCHIDA, YUICHI SETSUHARA, Osaka University — Plasma-assisted mist chemical vapor deposition of ZnO films was performed for transparent conductive oxide formation of flexible electronics. In this study, ZnO films deposition using atmospheric-pressure He plasma generated by a micro-hollow cathode-type plasma source has been demonstrated. To obtain detail information according to generation of species in the plasma, the optical emission spectra of the atmospheric pressure He plasma with and without mist were measured. The result without mist shows considerable emissions of He lines, emissions attributed to the excitation and dissociation of air including N₂ and O₂ (N, O, and NO radicals, and N₂ molecule; N₂ second positive band and first positive band), while the results with mist showed strong emissions attributed to the dissociation of H₂O (OH and H radicals). The deposition of ZnO films was performed using atmospheric-pressure He plasma. The XRD patterns showed no crystallization of the ZnO films irradiated with pure He. On the other hand, the ZnO film crystallized with the irradiation with He/O₂ mixture plasma. These results indicate that the atmospheric-pressure He/O₂ mixture plasma has sufficient reactivity necessary for the crystallization of ZnO films at room temperature.

¹This work was supported partly by The Grant-in-Aid for Scientific Research (KAKENHI) (Grant-in-Aid for Scientific Research(C)) from the Japan Society for the Promotion of Science (JSPS).

Kosuke Takenaka
Osaka University

Date submitted: 19 Jun 2015

Electronic form version 1.4