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Spectroscopic evidence for limited carrier hopping interaction in amorphous ZnO thin film DEOK-YONG CHO, Sungkyunkwan University, JEONG HWAN KIM, KWANG DUK NA, JAEWON SONG, CHEOL SEONG HWANG, CHUL-HEE MIN, SE-JUNG OH, Seoul National University, BYEONG-GYU PARK, JAE-YOUNG KIM, Pohang Light Source & POSTECH — The electronic structure of amorphous ZnO film (a-ZnO) was examined by O K- and Zn L₃-edge x-ray absorption spectroscopy and valence band photoemission spectroscopy. Comparative studies of a-ZnO and a wurtzite ZnO (w-ZnO) revealed a decrease in Zn 4s-O 2p hybridization strength and the localization of Zn 4s band as a consequence of local structural disorder, indicating limited electron hopping interactions in a-ZnO. The 0.1 eV higher Fermi-level of a-ZnO compared to w-ZnO suggests that the electrical properties of a-ZnO are different from those in w-ZnO due to structural disorder, even in the absence of impurities or grain boundaries.

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