Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Obsavation of amorphous InGaZnO by aberration corrected transmission electron microscope TAKAHIRO SUZUKI, KUNIO TAKAYANAGI, Tokyo Institute of Technology; Crest, JST — Transparent amorphous oxide semiconductors (TAOSs) such as amorphous InGaZnO (a-IGZO) have been receiving a good deal of attention [1,2]. High conductivity of TAOSs is understood by the overlap between metal s- orbitals, where metals locate at oxygen octahedral sites. We investigated local order of metals by transmission electron microscopy in which electron phases are well adjusted using aberration correctors up to the wave vector of $2\pi/50$ pm. Auto correlation of high resolution electron micrographs of a-IGZO thin films showed the first nearest neighbor metal-metal distance. Metal-metal distance depends on the overlapping between the s-orbitals, so that such structural information helps characterization of electron mobility of TAOSs.

[1] K. Nomura, et al., Nature (London) 488, (2004) 432
[2] K. Nomura, et al., Phys. Rev. B 75, (2007) 035212

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Date submitted: 11 Dec 2012 Electronic form version 1.4