

BACK-END OF LINE COMPATIBLE TRANSISTORS FOR HYBRID CMOS APPLICATIONS

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The low-temperature back-end of line (BEOL) compatible transparent amorphous oxide semiconductor (TAOS) TFTs and poly-Si TFTs are the suitable platforms for three-dimensional (3D) integration hybrid CMOS technologies. The n-channel amorphous indium tungsten oxide (a-IWO) ultra-thin-film transistors (UTFTs) have been successfully fabricated and demonstrated in the category of indium oxide based thin film transistors (TFTs). We have scaled down thickness of a-IWO channel to 4nm. The proposed a-IWO UTFTs with low operation voltages exhibit good electrical characteristics: near ideal subthreshold swing (S.S.) ~ 63mV/dec., high field-effect mobility (μ_{FE}) ~ 25.3 cm²/V-s. In addition, we also have fabricated the novel less metal contamination Ni-induced lateral crystallization (LC-NILC) p-channel poly-Si TFTs. The matched electrical characteristics of n-channel and p-channel devices with low operation voltage and low IOFF are exhibiting the promising candidate for future hybrid CMOS applications.