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Thin film circuits with amorphous oxide thin film transistor

Amorphous oxide thin film transistors (AOTFT) have been fabricated by RF (Radio Frequency) magnetron sputtering with the bottom gate structure. AOTFTs exhibited to change stability under the bias and temperature stress and electrical properties strongly depending on Si ratio, mainly because Si atom can act as a good carrier suppressor. Therefore, the threshold voltage (V_{th}) of AOTFTs could be easily controlled by changing the Si ratio. Depletion load inverter model has been consisted by using only n-type AOTFTs. This inverter model is operated by difference of V_{th} between depletion mode (D-mode) and enhancement mode (E-mode) controlled by Si ratio. Furthermore, the conventional NMOS logic circuit models was adopted for the realization of AOTFT-based logic circuits such as NAND, NOR and ELSE. The proposed logic circuit composed by only n-type AOTFTs could be promising in terms of high performance and simply controllable thin film type for next generation integrated circuit applications.

Biography

Sang Yeol Lee obtained his BS Degree in the Department of Electrical Engineering at Yonsei University (Republic of South Korea) in 1986; MS and PhD Degrees in the Department of Electrical and Computer Engineering from State University of New York at Buffalo (USA) in 1990 and 1992, respectively. He has been a Full Professor in the Department of Semiconductor Engineering at the Cheongju University; Full Professor and Director of Research Institute of Advanced Semiconductor Convergence Technology. He was invited as a Visiting Scholar in Electronic Device Team, Los Alamos National Lab (USA) in 2002–2003. His research areas are ZnO electronics including oxide TFTs, LEDs, transparent conducting oxides, semiconductor processing, nanoelectronics, memory devices and displays. He is mainly interested in Materials Science.

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