Modeling of Amorphous InGaZnO Thin-Film Transistors

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Amorphous metal oxide semiconductor (AMOS) thin-film transistors (TFTs), due to their high uniformity over large area, low-processing temperature, high field-effect mobility, high current on-off ratio, and low subthreshold swing, are showing increasing promise as suitable devices for future flexible flat-panel displays. A physically based device model for which parameters can easily be extracted and can be directly related to the material properties of the TFT is essential for circuit simulations. In this project, we developed a DC SPICE model for a-InGaZnO TFTs based on modified RPI a-Si TFT model. From the simulation results shown below, we can see that this model is able to reproduce our experimental TFT data very well. The ultimate goal of this project is to design advanced pixel circuits for AM-OLEDs. This project is supported by Canon Research Center, Tokyo, Japan.