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Effect of a Ru doped SnO_{2-x} buffer layer on thin-film transistors based on SnO_{2-x} channel layer HYOSIK MUN, HYEONSEOK YANG, KOOKRIN CHAR, Seoul National University — We report on studies of transparent thin-film transistor (TFT) devices based on SnO_{2-x} thin film. SnO_{2-x} thin films were prepared by pulsed layer deposition with and without Ru-doped SnO_{2-x} buffer layer on r-plane sapphire substrates to investigate the effect of a Ru-doped SnO_{2-x} buffer layer on the electrical properties of SnO_{2-x} channel layer. The Ru-doped SnO_{2-x} buffer layer was found to be very crystalline and insulating at the same time. Using such Ru-doped SnO_{2-x} buffer layer made it possible for the SnO_{2-x} channel layer to have both low carrier density and high mobility, probably due to reduction of the threading dislocation density. AlO_x gate insulator layer was deposited by atomic layer deposition and ITO was used as the source, the drain, and the gate electrodes. We will compare the TFT performances with or without the Ru-doped SnO_{2-x} buffer layer and discuss how such buffer layer enables the necessary device parameters for TFT.

Hyosik Mun
Seoul National University

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