High-performance amorphous indium-zinc-oxide thin film transistors

A. Zaslavsky, Yang Song, S. Siontas, and D. C. Paine
Dept. of Physics and School of Engineering, Brown University, Providence RI, USA

Amorphous oxide semiconductors, such as indium zinc oxide (IZO), can be deposited at room temperature and achieve a high charge carrier density combined with reasonably high mobility, leading to their recent technological insertion as thin film transistors for display applications. These same factors, combined with arbitrary substrate compatibility, easy regrowth and low-temperature *in-situ* oxidation for doping control and dielectric formation, makes these materials a promising platform for integration-ready radio-frequency transistors.

We report on a recently demonstrated *in-situ* annealed gate stack fabrication process to produce high-performance top-gated IZO TFTs [1], shown in Fig. 1, with on/off current rations > 10^7 and respectable subthreshold slope of 140 mV/decade. The same *in-situ* fabrication process appears promising for multifinger vertical current flow devices, with high current-carrying capability.

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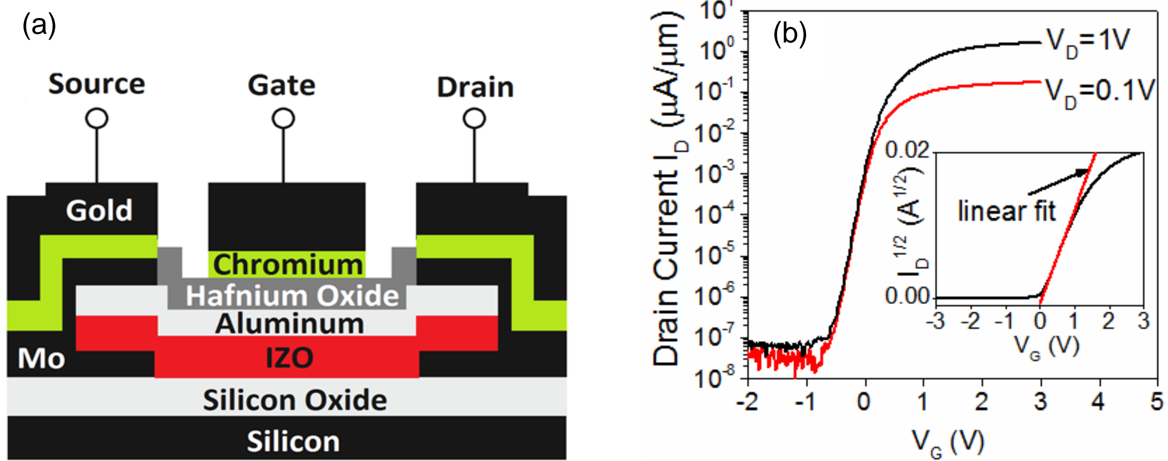

Fig. 1. (a) Schematic of as-deposited IZO TFT layer structure, the thin Al layer is converted into Al_2O_3 by *in-situ* annealing; (b) transfer characteristics of an L_G = 50 μm TFT

1. Yang Song *et al.*, *IEEE Electron Dev. Lett.* **35**, 1251 (2014).