Indium gallium zinc oxide thin film transistors grown by organic vapor phase deposition (OVPD)

(a)

(b)

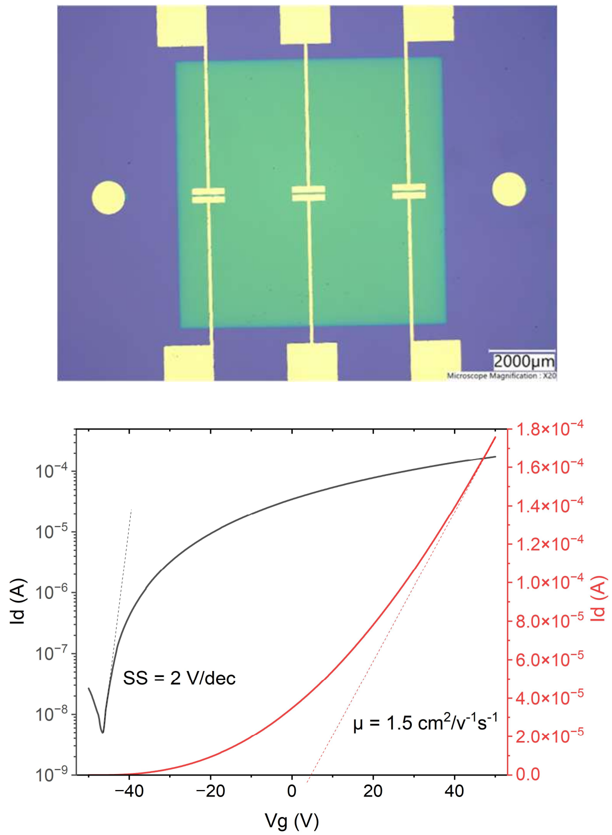

Figure: (a) Optical microscope image of IGZO TFTs on a SiO_2/Si substrate. (b) Transfer curve of a typical IGZO TFT in the linear regime.

Objective

➢ Uniform amorphous IGZO thin films prepared by organic vapor phase deposition (OVPD) and high-performance thin-film transistors (TFTs) for OLED display backplanes.

Impact

IGZO itself, or combined with low-temperature polycrystalline silicon (LTPS), is a low-temperature polycrystalline oxide (LTPO). These oxides are increasingly being utilized as channel materials in TFT backplanes for advanced OLED displays to achieve a low off-current and high switching speed. Depositing precursors onto a substrate using OVPD, followed by annealing offers a unique approach to obtaining IGZO thin films, taking advantage of the enhanced material utilization efficiency of OVPD because the heated chamber walls prevent precursor condensation during thin-film deposition. Furthermore, this method paves the way for the maskless patterning of IGZO via organic vapor jet printing.

Facilities and Methods Used

- OVPD
- X-Ray Photoelectron Spectroscopy (XPS)
- E-beam deposition
- Photolithography

Funding

- Universal Display Corporation

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