

Fabrication of FETs Based on La-BaSnO₃ Perovskite Oxide

CNF Project Number: 2543-17

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Primary Source of Research Funding: Air Force Office of Scientific Research – DOD

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Primary CNF Tools Used: PVD75 sputter deposition, AJA ion mill, Oxford ALD FlexAL

Abstract:

A field effect transistor based on La-BaSnO₃ (BLSO) has been made. The BLSO is a perovskite oxide material with high mobility and oxygen stability. The BLSO film was grown by molecular beam epitaxy. It has been etched with the AJA ion mill to make a channel layer, and ITO is deposited on the channel layer as the source and drain contact layer by PVD75 sputter deposition. ALD-grown HfO₂ film was deposited on it as a dielectric oxide by Oxford ALD FlexAL. ITO is deposited again by the same tool as a gate electrode. The schematic is shown in Figure 1. The device shows good characteristic curve in terms of I_{ds} - V_{ds} and I_{ds} - V_{gs} . The on-off ratio is over 6×10^6 and mobility is over $20 \text{ cm}^2/\text{V}\cdot\text{s}$. The characteristic curve of the device is shown in Figure 2 and Figure 3.

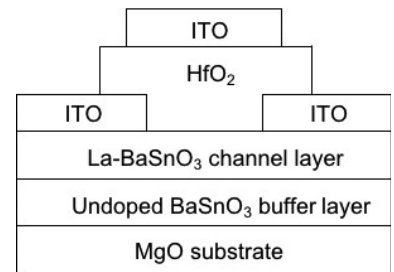


Figure 1: Schematic of the field effect transistor based on La-BaSnO₃.

Summary of Research:

Field effect transistor based on La-BaSnO₃ (BLSO) has been fabricated and nice characteristic curves with high on-off ratio over 6×10^6 and mobility over $20 \text{ cm}^2/\text{V}\cdot\text{s}$ has been shown.

References:

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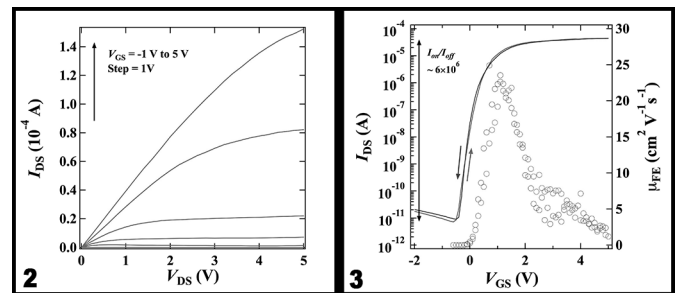


Figure 2, left: Output characteristic curve of the device. Figure 3, right: Transfer characteristic of the device.

