

# Localized Tail States and Electron Mobility in Amorphous ZnON Thin Film Transistors

Sungsik Lee and Arokia Nathan

The Hetero-Genesys Laboratory, Department of Engineering, University of Cambridge

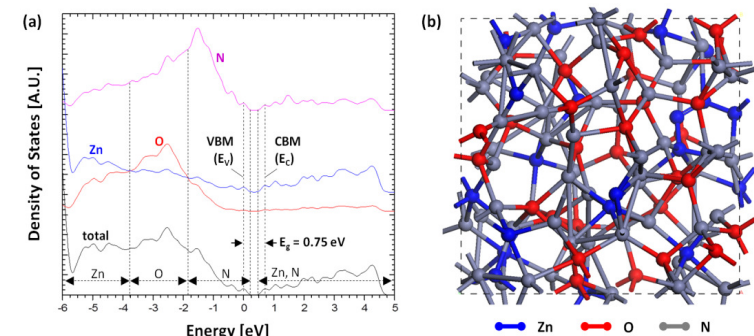
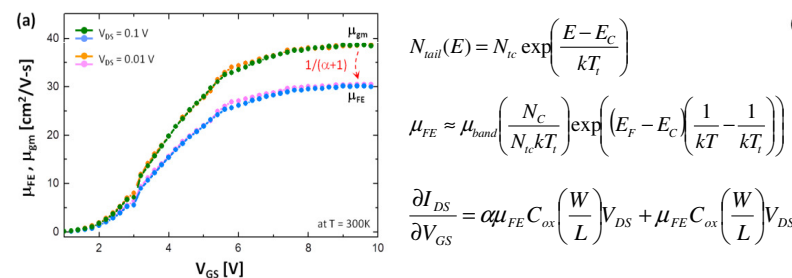
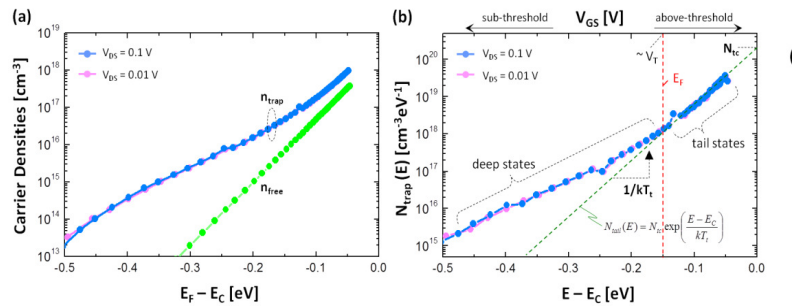
(E-mails: sl684@cam.ac.uk, an299@cam.ac.uk)

## Introduction

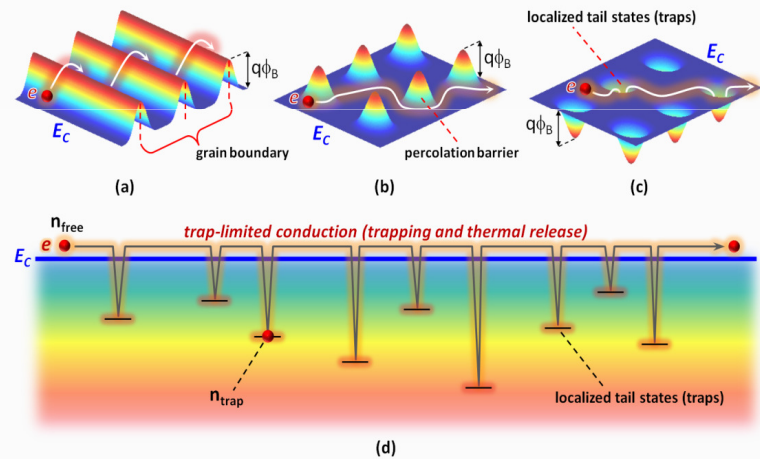
- The density of localized tail states in a-ZnON TFTs deduced from the measured current-voltage characteristics, and electron mobility retrieved using a self-consistent extraction method based on trap-limited conduction theory.
- Oxygen and/or nitrogen vacancies to be ionized under illumination with  $h\nu \gg E_g$ , leading to very mild persistent photoconductivity (PPC).

## Results and Discussions

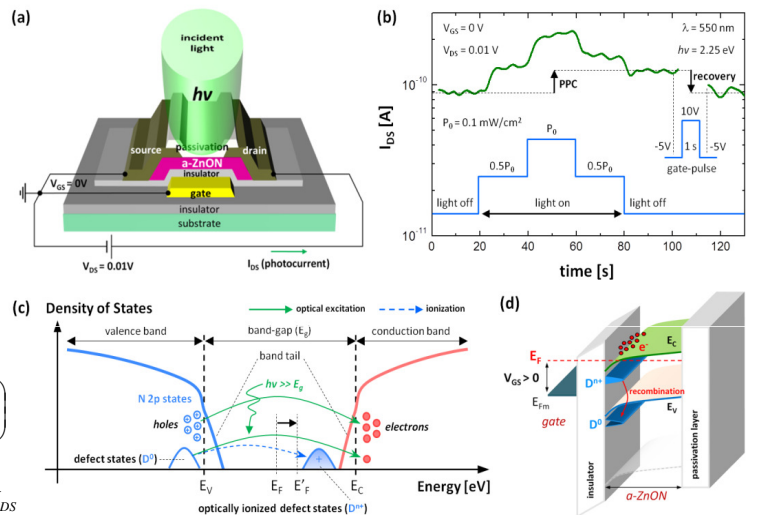
- Density of tail states and electron mobility:



- Possible carrier transports in disordered films:



- Observation of PPC and underlying mechanism:



## Conclusion

- Electron mobility found to be more accurate with considering density of tail states retrieved from the I-V characteristics.
- Mild PPC observed in the ZnON film where anion (nitrogen) was added to compensate oxygen defects, suggesting the presence of unfilled oxygen and/or nitrogen vacancies.