EFFECT OF UV/OZONE TREATMENT TIME ON PENTACENE THIN-FILM TRANSISTORS

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- INTRODUCTION

Organic materials due to their low process temperature and compatibility with flexible plastic substrates are becoming the cost efficient substitutes to inorganic materials. Their ability to be applied over large areas makes them attractive for large-area electronics. Their applications range from flexible displays to solar cells, sensors and RFID tags.

- OBJECTIVE

To develop low-temperature process for low-voltage p-channel transistors, amenable to plastic foil substrates.

- TRANSISTOR STRUCTURE

- EXPERIMENT

- TRANSISTOR TRANSFER AND OUTPUT CHARACTERISTICS

- RESULTS

- TRANSISTOR PERFORMANCE

Field-effect mobility $\mu_p = 0.04 \rightarrow 0.16 \text{ cm}^2/\text{Vs}$
Threshold voltage $V_t = -1.5 \rightarrow -1.9 \text{ V}$
On-off current ratio $I_{on}/I_{off} \sim 10^6$
Sub-threshold slope $S \sim 150 \text{ mV/decade}$

- CONCLUSIONS

- Field-effect mobility and the threshold voltage decrease with increasing UV/ozone time
- UV/ozone time has little effect on the off-current, gate leakage current, sub-threshold slope, and the gate dielectric breakdown voltage.

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Krishna Chinnam is recipient of a PhD scholarship funded by Glasgow Research Partnership in Engineering (GRPE).
He acknowledges help from the School of Engineering, University of Glasgow.