High mobility low driving voltage organic transistor with high-k amorphous BST (Ba_{0.7}Sr_{0.3}TiO_3) gate dielectric

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**A. Motivation**

- Curve shows transistor count doubling every two years

**B. Device structures on Si and PEN substrate**

- Small driving voltage
- Large area
- Flexible substrate

**C. Device performance**

(i) The characterization of BST thin film on silicon

- Surface morphology of BST film
- XRD of BST thin film
- HRTEM of BST/Si interface

(ii) The performance of OTFT on BST thin film

**D. Characterizations of OTFT device and pentacene**

- BST thickness=770nm
- BST thickness=96nm

**E. Flexible device performance**

(i) The performance of transistor on flexible PEN substrate

- Bendable substrate
- Surface morphology of pentacene film

(ii) The performance of transistor at high frequency

**F. Conclusions**

- The BST thin film derived by PLD technology at low temperature as 110°C is promising in fabricating large area low operating voltage devices on flexible substrate. The mobility of the transistor based on the BST of 770 nm in thickness can reach 2.5 cm² V⁻¹ s⁻¹. The on/off ratio is in the range of 10⁵⁻¹⁰⁶ the sub-threshold swing is around the 100mv/dec. And the threshold voltage is around -1V.

**References**