実用レベルの高移動度有機半導体

High Mobility Organic Semiconductor for Practical Transistor

p型有機半導体 DOSCシリーズ（開発品）

P-Type Organic Semiconductor DOSC Series (Under Development)

主な用途 Main Applications

- 電子ペーパー、フレキシブルセンサーなどのトランジスタ
- Transistors for Electronic Paper, Flexible Sensors, etc.

特　徴 characteristics

高溶解タイプ：DOSC-100

- 溶媒溶解性：芳香族系や塩素系溶媒に対して高い溶解性
  （例えば、p-キシレン：1wt%：スピンコート、ドロップキャスト、ダイコート、IJ等による半導体層形成が可能）
- 素材の大気安定性：良好（大気下放置>1年、変質なし）
- 半導体特性（FET移動度）：～2 $cm^2 V^{-1} s^{-1}$

高移動度タイプ：DOSC-020

- 半導体特性（FET移動度）：～10 $cm^2 V^{-1} s^{-1}$
- 素材の大気安定性：良好（大気下放置>1年で変質なし）
- 半導体形成法：真空蒸着（加熱溶液による湿式形成も可能）

High Solubility Type：DOSC-100

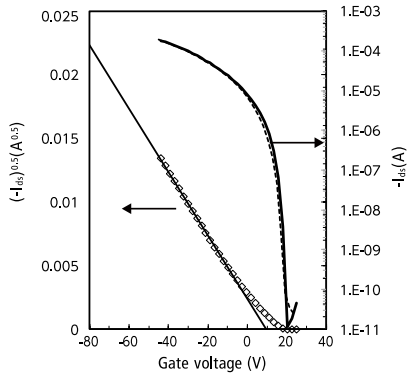
- Great solubility for aromatic and chlorinated solvent:
  ex.) p-xylene 1wt%, OSC layer can be formed from spin coating, die coating, drop casting and IJ.
- High Mobility：~2 $cm^2 V^{-1} s^{-1}$
- Excellent Material Stability：stable in the air over 1 year

High Mobility Type：DOSC-020

- High Mobility：~10 $cm^2 V^{-1} s^{-1}$
- Excellent Material Stability：stable in the air over 1 year
- Semiconductor Manufacturing Process: Vacuum evaporation
  (also supports wet process using heated solvent)

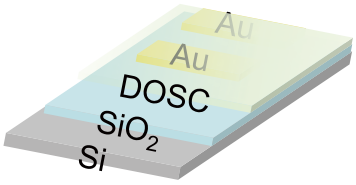
高溶解タイプ：DOSC-100　High Solubility Type：DOSC-100

Model Device Performance



V_{ds} = −100V
under ambient atmosphere

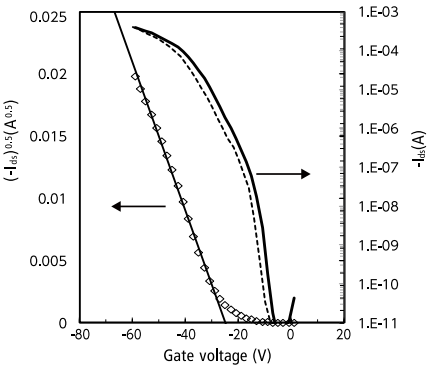
Model Device Structure



Spin-coated on thermal oxide Si wafer with chemically modified Au source−drain electrodes (W/L = 500/100 μm)
All process steps carried out under ambient atmosphere

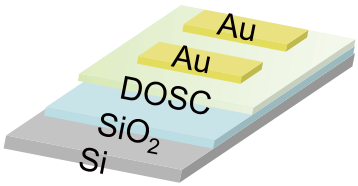
高移動度タイプ：DOSC-020　High Mobility Type：DOSC-020

Model Device Performance



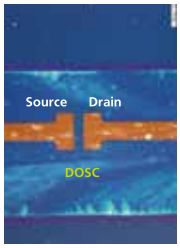
V_{ds} = −100V
under ambient atmosphere

Model Device Structure

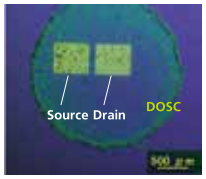


Vacuum-evaporated on thermal oxide Si wafer with the top contact configuration of Au source−drain electrodes (W/L = 500/100 μm), followed by thermal annealing treatment at 120°C

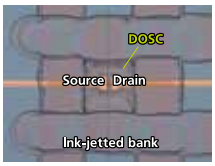
半導体形成例

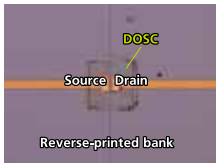


Blade-coated on a polymer dielectric with the bottom contact configuration of chemically modified Au source−drain electrodes (W/L = 100/20 μm)

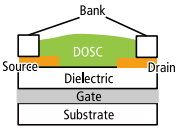


Drop-casted on a polymer dielectric with the bottom contact configuration of chemically modified Au source−drain electrodes (W/L = 500/100 μm)

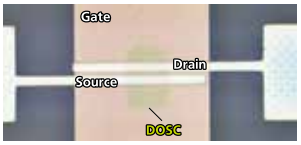




Ink-jetted inside a bank, on a polymer dielectric with the bottom contact configuration of chemically modified Au source−drain electrodes (W/L = 100/20 μm)



Schematic for cross section image



Vacuum-evaporated using a shadow mask on a polymer dielectric with the top contact configuration of Au source−drain electrodes (W/L = 200/20 μm)

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