

Solution-Processed Organic Single-Crystal Transistors

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The development of organic thin-film transistors (TFTs) has been intensively driven by the fact that they can be fabricated by easy and potentially low-cost processes. Solution-based processes are the most desired for producing high-performance organic TFTs in this regard. However, the transistor performances of such devices are not yet sufficiently high to replace amorphous silicon TFTs in practical applications. In this presentation, I report high-mobility charge transport in organic TFTs produced from solutions, employing a method of oriented crystal growth on a substrate for a derivative of 2,7-dioctylbenzothieno[3,2-b]benzothiophene (C₈-BTBT). This method was also applied to fabricating top-contact transistor arrays, in which typical mobility values are more than a few cm²/Vs. The value is significantly higher than those of typical amorphous silicon TFTs.