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Improving the electrical characteristics of a solution-processable, anthradithiophene organic semiconductor by solvent vapor annealing KIMBERLY DICKEY, University of Texas at Austin, JOHN ANTHONY, University of Kentucky, YUEH LIN LOO, University of Texas at Austin — The development of organic semiconductors is driven by the promise of low-cost device applications. To fully realize cost-effective organic electronics, solution-processable materials need to be developed. While several solution-processable materials have been demonstrated, these materials often suffer from significantly reduced carrier mobilities due to defects and grain boundaries introduced during the deposition process. We have been studying triethylsilyl anthradithiophene (TES ADT), a solution-processable, p-type organic semiconductor. Transistors fabricated with spun-cast TES ADT exhibit low carrier mobilities ($0.002 cm^2$/V-s). Subjecting the fabricated transistors to dichloroethane solvent vapor annealing, however, yields average carrier mobilities of $0.2 cm^2$/V-s. Additionally, the current hysteresis observed during device operation is eliminated with this annealing. This dramatic improvement in transistor performance is solvent choice dependent, and can be directly correlated with morphological transformations in the thin film.

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