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Classification of Semiconducting Polymeric Mesophases to Optimize Device Post-Processing CHAD SNYDER, RYAN NIEUWENDAAL, DAVID VANDERHART, LEE RICHTER, R. JOSEPH KLINE, DEAN DELONGCHAMP, National Institute of Standards and Technology, MARTIN HEENEY, IAIN MCCULLOCH, Imperial College of London — Semiconducting polymers form a variety of phases and mesophases that respond differently to post-deposition solvent or thermal treatments. Here it is shown that classification of these materials into their appropriate mesophases can be a useful tool to optimize their post-deposition treatments. Calorimetry is used to quantify differences between very similar materials, using a well-established framework based on the kinetics and thermodynamics of phase changes. By way of example, this classification scheme is used to identify differences in the presence and distribution of mesophases in three polymers, poly(3-hexylthiophene) and two isomeric bithiophene-thiophene copolymers (pBTTT and pATBT). The diverse phase structure is notable in light of the molecular similarity of the three polymers, and it has impact on optimum post-processing conditions for maximum electrical performance in thin film transistor devices.

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