Abstract

The power conversion efficiency of non-fullerene organic solar cells develops dramatically in recent years. Although tremendous efforts have been dedicated to the design and synthesis of new small molecular acceptors, less is known on how the molecular order and aggregation of these small molecular acceptors will affect the device performance. A high structure order is a desired to achieve high charge transport property, however, it can also induce excessive phase aggregation and consequently reduce the exciton dissociation efficiency to reduce device performance. We have employed a number of physical approaches to manipulate the molecular order and aggregations of polymer donors and non-fullerene acceptors to enhance efficiency. In particular, this talk will discuss our recent work on heating-induced-aggregation and nonfullerene acceptor fibril strategies for optimizing the morphology towards high performance.