Effect of Morphology on the Performance of Organic Solar Cells

Abstract:
Organic polymer solar cells have attracted increasing attention over the last decade. Substantial efforts have been made in order to improve the performance of these low cost, solution processed photovoltaic devices, resulting in efficiencies as high as 5% compared to merely 1% in the early 2000s. Beside the planar heterojunction - bilayer structure-and the bulk heterojunction - a blend of the acceptor and donor polymers - a new concept has recently emerged, namely nanopatterning the donor and/or acceptor materials. Our simulation study aims to investigate the effect of different patterns on the performance of the solar cells. The different simulated structures are then compared with a bulk heterojunction in terms of fill factor, open circuit voltage and short circuit current.