Enhancing the Efficiency of Organic Solar Cells Using Metallic Nanoparticles

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Abstract : In recent years, bulk heterojunction organic solar cells (BHJ OSCs) based on polymer-fullerene attracted a large research attention due to their numerous advantages such as light weight, easy processability, eco-friendly, low-cost, and capability for large area roll-to-roll manufacturing. BHJ OSCs usually suffer from insufficient light absorption due to restriction on keeping thin (< 150 nm) photoactive layer because of small exciton diffusion length (~ 10 nm) and low charge carrier mobilities. It is thus highly desirable that light absorption as well as charge transport properties are enhanced by alternative methods so as to improve the device efficiency. In this work, therefore, we have focused on the strategy of incorporating metallic nanostructures in the active layer or charge transport layer to enhance the absorption and improve the charge transport.

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