Utilizing plasmonic opto-electrical effect toward high performance organic solar cells

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While many studies have found that the power conversion efficiency of OSCs is improved by inserting metal nanoparticles into the OSCs, little has been reported on the use of size- and shape-controlled metal nanoparticles for fine-tuning the optical properties. Here, we investigate the dependence of silver nanoparticles' size and shape, at various concentrations, on the power conversion efficiency of OSCs[1]. Also, we propose a metal-metal core-shell nanocube (NC) as an advanced plasmonic material for highly efficient organic solar cells (OSCs). We covered an Au core with a thin Ag shell as *a scattering enhancer* to build Au@Ag NCs, showing stronger scattering efficiency than Au nanoparticles (AuNPs) throughout the visible range. Highly efficient plasmonic organic solar cells were fabricated by embedding Au@Ag NCs into an anodic buffer layer, poly(3,4-ethylenedioxythiophene):poly(styrenesulfonate) (PEDOT:PSS)[2, 3].

References

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