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Patterned nanocontacts on blended photovoltaic films for probing of local photoresponse NIKOLAI ZHITENEV, NIST, SUYONG JUNG, UMD, NIST, PAUL HANEY, BEHRANG HAMADANI, NIST — Probing of nanoscale photocurrent by photoconductive atomic force microscopy (PCAFM) provides spatially resolved information on the nature of inhomogeneity related to material blending in organic bulk heterojunction solar cells. However, interpretation of the data is often complicated due to the nontrivial nature of tip/sample contact. Here, we pattern the active layer of the P3HT:PCBM solar cells by arrays of silver nanodots with sub-micron spatial resolution, and probe the photoresponse from each metal dot by a PCAFM system under illumination. The rigid geometry of the nanodot, the well-defined contact and the low work function of silver allows for better characterization of photoresponse from the film and a trend that allows us to generalize their response to macroscopic devices. We also show modeling results based on equivalent circuit elements to better understand the current-voltage characteristics of these photovoltaic nanodevices.

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