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# Functionalized silicon nanowires/conjugated polymer hybrid solar cells: optical, electrical and morphological characterizations

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## Abstract

We investigate the effects of Si nanowires surface modification with polystyrene (PS) on the performance of bulk heterojunction hybrid solar cells based on poly[2-methoxy-5-(2'-ethylhexyloxy)-1,4-phenylene vinylene] (MEH-PPV) and PS-SiNWs. The optical, electrical and morphological properties of these hybrid nanocomposites have been investigated. Due to charge transfer efficiency, improved electrical coupling between SiNWs and MEH-PPV and homogeneous dispersion of functionalized SiNWs, the performance of studied photovoltaic structure shows a significant improvement with the progressive addition of PS-SiNWs. With polystyrene surrounded SiNWs as acceptor materials, the device typically shows a  $J_{SC}$  of 7.36  $\mu\text{A}/\text{cm}^2$ ,  $V_{OC}$  of 0.87 V and a FF of 48% for the composition MEH-PPV:PS-SiNWs (1:4).

Keywords: A: Organic compounds; A: Composites; D: Luminescence; D: Optical properties; D: Electrical properties.

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