

Abstract Submitted
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Optical Fiber/Nanowire Hybrid Structures for Efficient Three-Dimensional Dye-Sensitized Solar Cells¹ YAGUANG WEI, BENJAMIN WEINTRAUB, ZHONGLIN WANG, SCHOOL OF MATERIALS SCIENCE AND ENGINEERING, GEORGIA INSTITUTE OF TECHNOLOGY TEAM — We report an innovative hybrid structure integrating optical fibers and nanowire (NW) arrays as three-dimensional dye-sensitized solar cells that have significantly enhanced energy conversion efficiency. The light illuminates the fiber from one end along the axial direction, and its internal reflection within the fiber creates multiple opportunities for energy conversion at the interfaces. In comparison to the case of light illumination normal to the fiber axis from outside of the device, the internal axial illumination enhances the energy conversion efficiency of a rectangular fiber-based hybrid structure by a factor of up to six; and the absolute full Sun efficiency has been increased up to 3.3%. This research demonstrates a new approach with advantageous of high efficiency, expanded mobility and surface adaptability, and concealed/remote operation capability.

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