Abstract Submitted
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Scalable Synthesis of Vertically Aligned, Catalyst-Free Gallium Arsenide Nanowire Arrays – Towards Optimized Optical Absorption and Reflection.[1] MAOQING YAO, ANUJ MADARIA, CHUNYUNG CHI, CHENXI LIN, NINGFENG HUANG, University of Southern California, RUIJUAN LI, None, MICHELLE POVINELLI, DANIEL DAPKUS, CHONGWU ZHOU, University of Southern California, USC NANOLAB TEAM, USC COMPOUND SEMICONDUCTOR LABORATORY TEAM, USC NANOPHOTONICS LABORATORY TEAM — Vertically aligned, catalyst-free nanowires hold great potential for photovoltaic applications, where scalable synthesis and optimized optical absorption are critical. Here, we report using nanosphere lithography, scalable synthesis of vertical gallium arsenide nanowires grown by selected area MOCVD. A comparative study was done between regular nanowires arrays using electron beam lithography and slightly more defective nanowire arrays using nanosphere lithography. Reflection of light by the nanowire array has been used as a measure to study the effects of defects in the patterned structures using NSL both experimentally and by simulation. Both studies show similar reflection behavior between nanowire prepared by EBL and NSL. GaAs nanowires as short as 130 nm show reflection of <10% over the visible range of solar spectrum. Optimized nanowire configuration to maximize the absorption has also been discussed.

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