

반도체 나노와이어 합성 및 태양광에너지 응용 (Fabrication of semiconductor nanowire arrays and solar energy applications)

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The assembly of 1D nanostructures in the fabrication of nanoelectronic, nanophotonic and energy devices is currently attracting significant attraction due to nanowire's unique properties of high surface area, aspect ratio, single crystallinity and optical/electrical properties. Especially in solar energy devices, photo-anode of semiconductor nanowires provides efficient charge generation/transfer to minimize charge recombinations and high light absorption. Dye sensitized or semiconductor sensitized solar cells have been studied using semiconductor nanowires recently.

In this study we used a facile solution based synthetic route for the fabrication of ZnO nanowire arrays and various heterostructures of ZnO nanowires. Photocatalytic properties of the heteronanostructures were studied using UV/visible light decomposition of organic dyes. Also, solar energy conversion devices were fabricated using ZnO nanowire heterostructures as photoanodes. Our results present high solar energy conversion efficiency for semiconductor sensitized solar cell using ZnO heteronanowires.