

실리콘 와이어 어레이 및 에너지 소자 응용

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Silicon wire array fabrication for energy device

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Abstract : Semiconductor nanowires offer exciting possibilities as components of solar cells and have already found applications as active elements in organic, dye-sensitized, quantum-dot sensitized, liquid-junction, and inorganic solid-state devices. Among many semiconductors, silicon is by far the dominant material used for worldwide photovoltaic energy conversion and solar cell manufacture. For silicon wire to be used for solar device, well aligned wire arrays need to be fabricated vertically or horizontally.

Macroscopic silicon wire arrays suitable for photovoltaic applications have been commonly grown by the vapor-liquid-solid (VLS) process using metal catalysts such as Au, Ni, Pt, Cu. In the case, the impurity issues inside wire originated from metal catalyst are inevitable, leading to lowering the efficiency of solar cell.

To escape from the problem, the wires of purity of wafer are the best for high efficiency of photovoltaic device. The fabrication of wire arrays by the electrochemical etching of silicon wafer with photolithography can solve the contamination of metal catalyst.

In this presentation, we introduce silicon wire arrays by electrochemical etching method and then fabrication methods of radial p-n junction wire array solar cell and the various merits compared with conventional silicon solar cells.