Fabrication and Characterization of Free-Standing Silver Nanorod Arrays for Photovoltaic Devices

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Free-standing metal nanorod or nanowire arrays have attracted much attention in sensing, plasmonics, high density data storage, photocatalysts, photovoltaic devices, to name but a few. [1-5] In photovoltaics nanorod arrays are of particular interest for hybrid solar cells, whose near-optimum architecture is proposed to consist of arrays of nanostructures providing huge interfaces, efficient light harvesting and one-dimensional charge transport pathways.[6] The most conductive metal, silver, scaled down to nanoarrays is assumed to become one of the most favorable structures for hybrid solar cells. However, large scale fabrication of such nanostructures is necessary in order to make them viable for application in devices.

Here, we present large-area free-standing silver nanorod arrays on silicon substrates by anodic aluminium oxide template (AAO) - assisted electrochemical deposition. SEM images are shown below. These nanorod arrays will be characterized by TEM, UV-Vis, C-AFM, raman spectroscopy and Haze to investigate and optimize the electronic and optical properties. It is assumed that their application in hybrid solar cells will enhance the charge transport and light harvesting. This should ultimately lead to higher efficiencies.

References

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Figures

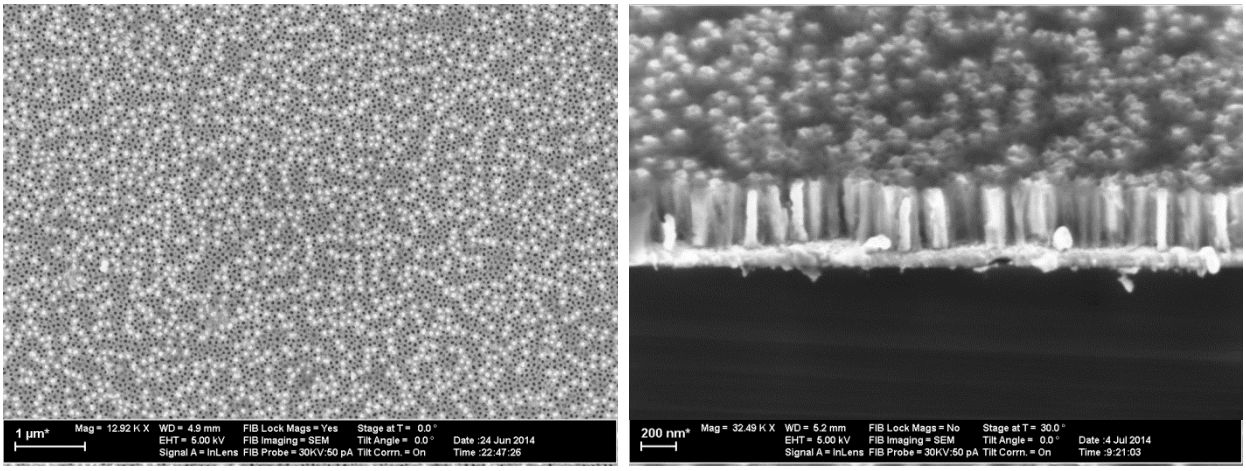

Fig.1 SEM images of silver nanorods embedding in AAO template: (a) top view and (b) cross-section view

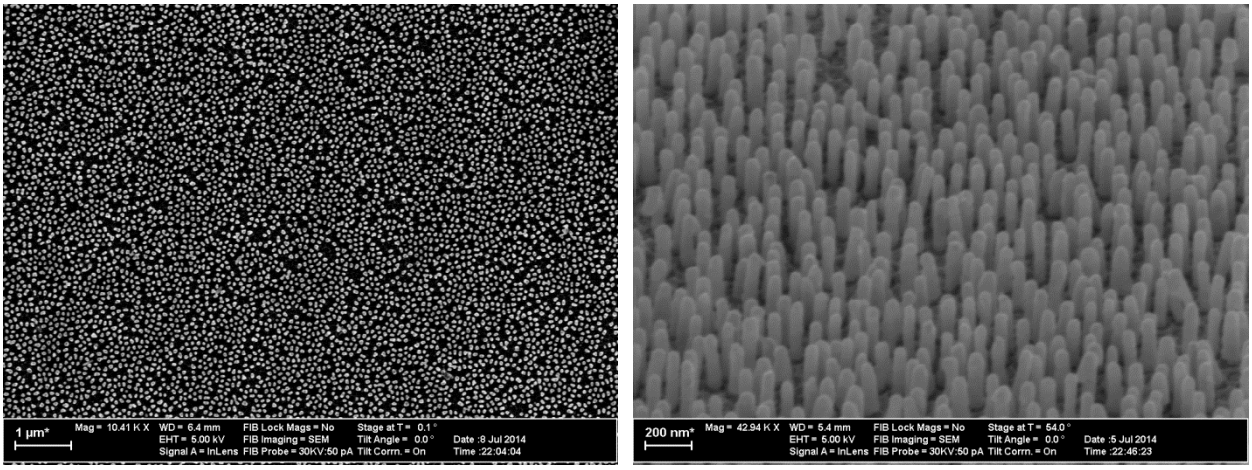

Fig.2 SEM images of free-standing silver nanorod arrays on silicon substrate after dissolving the AAO template: (a) top view and (b) angle view