

Template assisted synthesis of WO₃ nanowires
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Anodized Aluminum Oxide (PAA) template has been fabricated at three different anodization time intervals. The fabricated PAA template has been characterized by Scanning Electron Microscope. The SEM images revealed that the anodization time and temperature play key role on morphology and homogeneity of the PAA membrane. The PAA membrane fabricated at 0°C with first anodization time 5hrs followed by second anodization of 2 hrs (at 0°C) possesses homogeneous hexagonal porous structure with pore diameter 50nm, while the PAA template prepared at 0°C with first anodization time 2hrs and second anodization time 2 hrs (at 0°C) exhibited comparatively less uniform structure with pore diameter 50-180nm. In addition the inter pore distances in first sample was uniform i.e. 80nm, where as in second sample these interpore walls were not uniform and collapsed at some places. The self-assembled template is used for the fabrication of 1D nanostructure of tungsten by electro less deposition method. Density for anodization is calculated to be 8mAc^m². Uniform arrays of tungsten trioxide nanowires have been generated with pores of self-assembled PAA and characterized by SEM and XRD. SEM images show uniform array of nanowires with diameter of pores PAA templates i.e. 50nm. XRD patterns of nanowires confirm the presence of two crystalline forms of WO₃ i.e. monoclinic and orthorhombic. The current-voltage study revealed that when PAA with WO₃ nanowires is used as electrode in electrooxidation of ethanol, current density increases linearly with the increase in the voltage.

References

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