

Morphology and dimensions controlled of Titania nanotubes in mixed organic-inorganic electrolyte

ABSTRACT

The formation of self-organized and highly ordered Titania nanotubes was achieved by anodisation of Ti in a mixture of water-ethylene glycol electrolyte. Control over the dimensions and morphology of nanotubes was successfully established by changing the anodisation voltage, the ammonium fluoride (NH₄F) concentration and the anodisation time. A threshold voltage of 5 V is required for nanotube formation. Collapsed tubes were formed by applying electrochemical etching at high fluoride concentration. This study also showed that the nanotube lengths ranging from 0.5 to 2.6 μm could be formed by controlling the voltage applied and fluoride concentration with preferred growth along the c-axis.

Keyword: Anodic oxidation; Dimensions; Ethylene glycol; Morphology; Nanotubes.