



Cathodoluminescence of TiO₂ nanotubes prepared by low-temperature anodization of Ti foils

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<https://doi.org/10.1016/j.matlet.2010.07.028>

Abstract

We show that anodization of Ti sheets in an ethylene glycol and HF containing electrolyte at temperatures under 0°C results in the formation of a self-arranged ordered porous structure at the top surface of the sample. This perforated surface structure initiates the growth of an ordered array of titania nanotubes. The inner diameter of nanotubes can be modified in a controlled fashion in the range from 10nm to more than 250nm through the change of the electrolyte temperature from -20°C to +50°C. The spectral distribution of cathodoluminescence from a cluster of nanotubes clearly demonstrates the formation of resonator modes which are separated from each other by around 200meV.