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The effect of annealing temperature on morphology and structural properties of TiO₂ nanotubes membranes.

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Abstract

In this work, we present a simple electrochemical approach to obtain large-area free-standing TiO₂ nanotube (TNT) membranes, via anodic oxidation of pure Ti metal sheets. The highly ordered vertically oriented TNTs were characterized by SEM-EDS, XRD, CRM and AFM. SEM-EDS analysis confirms the presence of Ti and O-species in the as-prepared free-standing TNTs layer in significant amount. CRM has confirmed the presence of only Anatase phase TiO₂ with Raman vibration modes at 144.37 cm⁻¹, 199.04 cm⁻¹, 399.67 cm⁻¹, 516.16 cm⁻¹ and 639.29 cm⁻¹. The intensity of XRD peaks increases with the increase in heat treatment and better crystallinity occurs at higher temperatures. SEM and AFM analysis has revealed the presence of porous structure on the fabricated membranes. The study focused on the effect of annealing temperature on TNTs crystalline structure. Results showed that smooth surface and high aspect ratio TNTs were successfully fabricated.

Apply to be considered for a student award (Yes / No)?

Yes

Level for award (Hons, MSc, PhD, N/A)?

MSc

Main supervisor (name and email) and his / her institution

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Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

Y

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