

Fabrication of titania nanotube and its application for palmitic acid determination by electrochemical technique

ABSTRACT

Fabrication of titania nanotubes (TNTs) through electrochemical anodization and its application for the determination of palmitic acid has been explored. In this work, self-organized oxide tube or pore arrays of TNT has been achieved by adjusting the voltage and time of anodization. The TNTs prepared at 30 V for 2 hours resulted in highly ordered nanotubular structure. Type of electrolyte such as glycerol employed for electrochemical anodization of TNT affected the morphology which showed better result as compared to aqueous electrolyte. The application of the prepared TNTs towards palmitic acid has also been evaluated. The electrochemical detection of palmitic acid was based on the electrochemical reduction of quinone (2-methyl-1,4-naphthaquinone, VK3) to form corresponding hydroquinone. The developed method showed good linearity towards concentration of palmitic acid in the range of 2.3 mM to 6.2 mM ($R^2 = 0.9862$) with the detection limit of 1.006 mM.

Keyword: Anodization; Electrochemical; Palmitic acid; Quinone; Titanium nanotubes