

Investigation of the field emission from layered CNT/TiO₂ nanotubes under the light exposure

Yaser Abdi*, Hamidreza Arab Bafrani, Ali Sarikhani, Masud Ghasemi

Nanophysics Research Lab, Department of Physics, University of Tehran, Tehran, Iran

Received: 19.02.2018 Final revised: 01.12.2018 Accepted: 16.03.2019

Abstract

Today, field emission based electron sources play an important role in our life. Utilizing the field emitters in electron microscopes, field emission displays, and solar cells are the main applications of the field emission. In recent years, carbon nanotubes (CNTs) have been considered as the best known electron emitters due to their high electron conductivity. Moreover, TiO₂ nanotubes as a metal oxide semiconductor with the capability to grow on a conductive substrate are considered to be a promising candidate for electron field emitter. In this study, we have focused on investigating the field emission characteristics of the bare TiO₂ nanotubes and CNT coated TiO₂ nanotubes to achieve a high current electron emitter. The results have indicated that the two-layered nanostructures have a significantly higher electron emission compared with the bare TiO₂ nanotubes. Furthermore, the emission current from two-layered nanostructures increases under the light exposure.

Keywords: TiO₂ nanotubes, Carbon nanotubes, electron emission

* Corresponding Author: y.abdi@ut.ac.ir

