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## Effect of needle diameter and annealing temperature on TiO, nanofibers synthesized by electrospinning

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Titanium dioxide  $(TiO_2)$  based nanomaterials are non-toxic, eco-friendly and easy to fabricate at low cost. In the present study, TiO<sub>2</sub> nanofibers were synthesized by using cost-effective electrospinning technique. The effect of needle diameter on the TiO<sub>2</sub> nanofibers average diameter has been evaluated with four different needle internal diameters. The as-spun TiO<sub>2</sub> nanofibers were observed and analyzed by scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), X-Ray diffraction (XRD), Raman spectroscopy and diffuse reflectance spectroscopy (DRS) techniques. SEM explains the relation between the different needle internal diameter and the resulting average diameter of the nanofibers. EDS spectrum shows the effective elemental composition of pure TiO<sub>2</sub> nanofibers. The XRD peaks and Raman frequencies confirm the anatase, rutile and mixed phases of TiO<sub>2</sub> nanofibers has been clearly explained. Optical band gap calculated from DRS studies using Kubelka-Munk function. The resulting TiO<sub>2</sub> nanofibers has more advantages in the field of tissue engineering, gas sensors and photocatalysis.

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