

The morphology of electrospun titanium dioxide nanofibers and its influencing factors

Abstract

Titanium dioxide (TiO₂) has high photocatalytic activity and it is extensively applied in solar cell technology and environmental science. Electrospinning is acknowledged as the most versatile technique to fabricate nanofibers such as metal oxide nanofibers. Titanium dioxide nanofibers are generally prepared by electrospinning organic solutions containing alkoxide precursors and a carrier polymer with high voltage supply. The paper discusses on electrospun TiO₂ nanofibers including the spin dopes preparation history, influencing factors on fiber morphology and fiber characterizations. In particular, the parameters such as spin dopes viscosity, supplied voltage, feeding rate and effect of temperature that affect the morphology of the nanofibers are emphasized. Based on several studies, smaller diameter of TiO₂ nanofibers can be produced with lower viscosity solution, higher voltage and lower feeding rate. The heat treatment of 500 °C reduced the fiber size and produces crystallized anatase TiO₂ nanofibers.