

Electrospray deposition of titanium dioxide (TiO₂) nanoparticles

ABSTRACT

Deposition of titanium dioxide (TiO₂) nanoparticles was conducted by using eletrospray method. 0.05wt% of titanium dioxide suspension was prepared and characterized by using Malvern Zetasizer prior to the experiment. From Zetasizer results, stable suspension condition was obtained which is at pH 2 with zeta potential value of ± 29.0 mV. In this electrospraying, the suspension was pumped at flowrate of 5 ml/hr by using syringe pump. The input voltage of 2.1 kV was applied at the nozzle tip and counter electrode. Electrosprayed particles were collected on the grounded aluminium plate substrate which was placed at 10620 cm from counter electrode. Particles were then characterized using FESEM and average size of electrosprayed particles obtained. Initial droplet size was calculated by scaling law and compared with FE-SEM results in order to prove droplet fission occur during electrospray. Due to the results obtained, as the working distance increase from 10620 cm the deposited TiO₂ droplet size decrease from 2476116 nm to show droplet fission occur during the experiment.

Keyword: Titanium dioxide (TiO₂); Zeta potential; Electrospray