

Multivariable optimization of carbon nanoparticles synthesized from waste facial tissues by artificial neural networks, new material for downstream quenching of quantum dots

ABSTRACT

In this study, water-soluble carbon nanoparticles (CNPs) were synthesized by using waste facial tissue as a non-recyclable waste and the efficiency of CNPs in quenching mechanism of cadmium-telluride quantum dots (QDs) was investigated. In addition, CNPs synthesis was modeled by using artificial neural networks (ANN). To find the optimum model, ANN was trained by using different algorithms. Then, the generated models were statistically assessed and subsequently, the capability of the selected model for predicting the mean diameter size of the nanoparticles was verified. Based on the results, the model GA-4-7-1 had the most optimal statistical characteristics. Furthermore, the most pronounced effect on mean diameter size was associated to HNO₃ concentration while temperature demonstrated the least influence. Moreover, the quenching study confirmed the capability of the synthesized CNPs in quenching QDs.