Application of artificial neural network(ANN) for the prediction of size of silver nanoparticles prepared by green method

Abstract

The artificial neural network (ANN) models have the capacity to eliminate the need for expensive experimental investigation in various areas of manufacturing processes, including the casting methods. Determination of particle size is one of the critical parameters in nanotechnology.TheAg-NPs have attracted significant attention for chemical, physical and clinical applications due to their exceptional properties.The nanosilver crystals were prepared in the biopolymer mediated without any aggregation by using green chemical reduction method. The method has an advantage of size control which is essential in nano-metal synthesis. The resulting of silver nanoparticles (Ag-NPs) characterized by using of X-ray diffraction (XRD) and transmission electron microscopy (TEM) technique.XRD patterns confirmed that Ag-NPs crystallographic planes were face centered cubic (fcc) type. TEM results showed that mean diameters of Ag-NPs for four different amounts of variables were less than 40 nm. This method with comparison to other methods is green, high yield, speedy and easy to use.This paper presents an ANN model for the predictionsize of Ag-NPs by green method. Themodel accounts for the effect of NaOH volumes, temperature, stabilizer, and $AgNO_3$ concentration on the size of nanoparticle.The best model presented a trustworthy agreement in predicting experimental data. The characteristic parameters of the presented ANN models are fully reported in the paper.