An approach to predict the isobaric specific heat capacity of nitrides/ethylene glycol-based nanofluids using support vector regression

ABSTRACT

This study presents a novel strategy based on Bayesian support vector regression for the estimation of the specific heat capacity of nitrides/ethylene glycol-based nanofluid. The nanoparticles considered are aluminium nitride (AlN), silicon nitride (Si3N4) and titanium nitride (TiN). The proposed model was built using simple and easy-to-obtain inputs such as the size of the nanoparticles (20, 30, 50, and 80 nm), the molar mass of the nanoparticles, mass fraction of nanoparticles (0.01 - 0.1) and the temperature (288.15 K, 298.15 K, and 308.15 K). Our suggested model showed better prediction accuracy over the analytical models for the estimation of specific heat capacity of nitrides/ethylene glycol nanofluids. Given the simplicity of the model inputs and the accuracy of the model, the approach presented provides a more reliable prediction of specific heat capacity of nitrides-ethylene glycol-based nanofluids than previous models.

Keyword: Ethylene-glycol; Nitrides; Nanoparticles; Nanofluid; Support vector regression; Bayesian algorithm