عنوان مقاله:

Prediction the hydrogen adsorption isotherm on nickel decorated carbon nanotubes by applying artificial neural network modeling

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نویسندگان:

Mohammad Javad Tavakkoli - *I.R. Iran, Ferdowsi University of Mashhad, Faculty of Engineering, Chemical Engineering Department*

Elham Yasari - *I.R. Iran, Ferdowsi University of Mashhad, Faculty of Engineering, Chemical Engineering Department*

Nafiseh Farhadian - *I. R. Iran, Ferdowsi University of Mashhad, Faculty of Engineering, Chemical Engineering Department*

خلاصه مقاله:

The design and production of new materials to safely store hydrogen are challenging in hydrogen storage technology. Porous carbon materials such as carbon nanotubes (CNTs) are novel candidates for this aim. Predicting the hydrogen adsorption isotherm on these new materials can be done very effectively. Artificial neural network modeling (ANN) is a helpful tool for this aim. In this study, a feed-forward ANN with one hidden layer was constructed and tested to model the equilibrium data of hydrogen adsorption onto Ni-decorated CNTs. CNT properties like surface area, pore volume, and experimental conditions are used as inputs to predict the corresponding hydrogen uptake in equilibrium conditions. The constructed ANN was found to be precise in modeling the hydrogen adsorption isotherms for all inputs during the training process. The trained network successfully simulates the hydrogen adsorption isotherm for new inputs, which are kept unaware of the ANN during the training process. This shows the power of the created ANN model to determine adsorption isotherms for any operating conditions under the studied constraints.

کلمات کلیدی:

Hydrogen adsorption, Carbon Nanotube, Isotherm, Artificial neural network