Solubility Modeling of Diamines in Supercritical Carbon Dioxide Using Artificial Neural Network

1Mehri Esfahanian, 1Bahman Mehdizadeh, 1Ali Tardast, 2Behnam Zare and 3Hamid Reza Saeidi

1Islamic Azad University, Qaemshahr Branch, Department of Chemical Engineering, Qaemshahr, Iran.

2University of Applied Science and Technology, Sari, Iran.

3Faculty of Mechanical Engineering, Razi University of Kermanshah, Kermanshah, Iran.

Abstract: In this paper, ANN and semi-empirical equations has been applied for estimation of solubility in supercritical CO2 for two diamines (1, 5-naphthalenediamine, and 4, 4'-diamino diphenylmethane). Since solubility in supercritical fluids strongly depends on three variables including temperature, pressure and density of supercritical fluid, these three inputs devoted to the network and semi-empirical equations. In this paper a comparative study between ANN and semi-empirical equation has been done. Results showed accuracy of ANNs is more than other method. ARD for ANNs is 1.5% but semi-empirical equations have ARD about 5% and higher. Accuracy of Jouyban et al equations is more than other studied semi-empirical equations.

Key word: Diamines; Solubility; Supercritical carbon dioxide; Semi-empirical equation; artificial neural network (ANN).