中国化学工程学报 2007 15 (5): 765-771 ISSN: 1004-616x CN: 44-1063/R

RESEARCH NOTES

运用人工神经网络关联二元混合物中气液相平衡

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收稿日期 2007-3-6 修回日期 网络版发布日期 接受日期 2007-6-28

摘要 In this paper, a back propagation artificial neural network (BP-ANN) model is presented for the simultaneous estimation of vapour liquid equilibria (VLE) of four binary systems viz chlorodifluoromethan-carbondioxide, trifluoromethan-carbondioxide, carbondisulfied-trifluoromethan and carbondisulfied-chlorodifluoromethan. VLE data of the systems were taken from the literature for wide ranges of temperature (222.04—343.23K) and pressure (0.105 to 7.46MPa). BP-ANN trained by the Levenberg-Marquardt algorithm in the MATLAB neural network toolbox was used for building and optimizing the model. It is shown that the established model could estimate the VLE with satisfactory precision and accuracy for the four systems with the root mean square error in the range of 0.054—0.119. Predictions using BP-ANN were compared with the conventional Redlich-Kwang-Soave (RKS) equation of state, suggesting that BP-ANN has better ability in estimation as compared with the RKS equation (the root mean square error in the range of 0.115—0.1546).

关键词 vapour liquid equilibria artificial neural networks refrigerant

分类号

DOI:

Correlation of vapour liquid equilibria of binary mixtures using artificial neural networks

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Received 2007-3-6 Revised Online Accepted 2007-6-28

Abstract In this paper, a back propagation artificial neural network (BP-ANN) model is presented for the simultaneous estimation of vapour liquid equilibria (VLE) of four binary systems viz chlorodifluoromethan-carbondioxide, trifluoromethan-carbondioxide, carbondisulfied-trifluoromethan and carbondisulfied-chlorodifluoromethan. VLE data of the systems were taken from the literature for wide ranges of temperature (222.04—343.23K) and pressure (0.105 to 7.46MPa). BP-ANN trained by the Levenberg-Marquardt algorithm in the MATLAB neural network toolbox was used for building and optimizing the model. It is shown that the established model could estimate the VLE with satisfactory precision and accuracy for the four systems with the root mean square error in the range of 0.054—0.119. Predictions using BP-ANN were compared with the conventional Redlich-Kwang-Soave (RKS) equation of state, suggesting that BP-ANN has better ability in estimation as compared with the RKS equation (the root mean square error in the range of 0.115—0.1546).

Key words vapour liquid equilibria; artificial neural networks; refrigerant

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