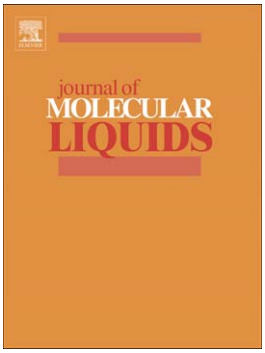

On the evaluation of thermal conductivity of ionic liquids: Modeling and data assessment

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On the Evaluation of Thermal Conductivity of Ionic Liquids: Modeling and Data Assessment

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Abstract: Among all physicochemical properties of ionic liquids (ILs), thermal conductivity has less been investigated both experimentally and theoretically. In this regard, experimental investigations and predictive models for thermal conductivity of ionic liquids have great importance for efficient design of heat transfer processes relevant to ILs, for instance in solar collectors. The aim of this study is to develop a robust precise model for prediction of thermal conductivity of ionic liquids. In order to estimate the thermal conductivity of pure ILs, a least square support vector machine was proposed based on 22 ionic liquids. The average absolute relative deviation for all studied systems is 1.03%, which is a satisfactory degree of accuracy for the proposed model. Also, the proposed model has higher accuracy compared to other models available in literature. In addition, the Leverage approach was implemented to check the reliability of the proposed model and the quality of experimental data. It was found both model development and its predictions are statistically valid and correct and only few data points were located out of the applicability domain of the proposed model.

Keywords: Ionic liquids, Thermal conductivity, Solar collector, Heat transfer, Support vector machine

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