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### Ionic Liquids as Heat Transfer Fluids – An Assessment using Plate and Tubular Exchanger Geometries

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#### ABSTRACT

The objective of this work is to carry out a practical assessment of using a typical ionic liquid as a heat transfer fluid. In order to carry out such an assessment, the thermophysical properties, namely, density, heat capacity, viscosity, and thermal conductivity need to be known for the chosen ionic liquid. A typical ionic liquid chosen for the current study is 1-butyl-3-methylimidazolium bis[(trifluoromethyl)sulfonyl]imide, ([bmim][Tf<sub>2</sub>N]) based on the availability of thermophysical properties over a range of temperatures. The assessment was carried out by simulating the heat transfer characteristics for this ionic liquid in two different types of heat exchangers, namely, a plate heat exchanger and a shell and tube heat exchanger.

Results of heat transfer behavior for the typical ionic liquid in these two exchanger types are described along with the comparison for a conventional heat transfer fluid. Finally conclusions are drawn about the potential of ionic liquids as heat transfer fluids taking into account the heat transfer assessment as well as a number of other practical considerations.