Reference Correlations for the Thermal Conductivity of Selected Molten Salts

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Molten salts are generally non-volatile liquids at high temperatures and have a wide electrochemical window compared with water. These properties make them very useful for a number of technical applications including electrochemical conversion of materials and energy, thermal storage, and heat transfer. Knowledge of their thermal properties is important in evaluating their suitability for these applications. However, one of the most important properties, the thermal conductivity, is extremely difficult to determine accurately by experimental means owing to the highly corrosive nature of the melts, their ionic conductance, and the fact they contribute to radiative transport at the high temperatures of interest, These factors have contributed to the unusually large discrepancies between measurements of the thermal conductivity of these materials that far exceed their mutual uncertainty. In this paper, all of the available experimental data for the thermal conductivity of several important molten salts are critically examined with the intention of establishing a reference correlation for the property as a function of temperature. All experimental data have been categorized into primary and secondary data according to the quality of measurement defined by a series of criteria. The primary data have then been employed to develop reference correlations for the selected molten salts.