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**Analyzing the Experimental Thermodynamic Data for Ionic Liquids and their Study as Thermal Energy Storage Materials.**

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# Analyzing the Experimental Thermodynamic Data for Ionic Liquids and their Study as Thermal Energy Storage Materials

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The aim of this work is to characterize a series of 1-alkyl-3-methylimidazolium saccharinate ionic liquids (alkyl standing for butyl, hexyl, octyl, and decyl),<sup>1</sup> analyze the experimental data, and assess their potential application in thermal energy storage.<sup>2</sup>

The characterization of this series of ionic liquids was carried out experimentally by measurements of heat capacity using the differential scanning calorimetry (DSC) and of density by the oscillating-tube densitometry. The experimental data were then analyzed by means of the advanced data analysis methods based on mathematical gnostics.<sup>3</sup> Mathematical gnostics is a novel non-statistical approach to data uncertainty. As such it enables us to evaluate the measurement uncertainty of statistically non-significant data sets containing as few as four datapoints and identify unreliable or outlying data.<sup>4</sup> Also, using a robust regression algorithms along a gnostic influence function, functional dependencies and structure-property patterns can be reliably determined. Modelling based on the COSMO-RS<sup>5</sup> model was used to predict density and heat capacity<sup>6</sup> for the studied ILs and compared with the experimental data.

## *References*

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