

Assessing the application potential of ionic liquids in heat storage

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Efficient energy utilization and storage become increasingly important as we face rapid climate change along with recent geopolitical challenges connected to the Russian aggression in Ukraine. Sustainable energy sources such as solar or wind are being more and more exploited but their utilization is often hindered by their intermittent supply. This said, efficient solutions already exist in electric energy storage, however, thermal energy storage is far from being fully developed.

This is why the research projects of our group address the current means of thermal energy storage and the possible use of ionic liquids as novel thermal fluids or phase-change materials. In order to design a reliable and efficient heat storage process, a good knowledge of fundamental thermodynamic properties is of key importance. Experimental methods of thermodynamic characterization of ILs as heat storage materials and their challenges will be discussed along with some examples of results obtained over the past few years. Last, but not least, advanced data analysis by means of methods based on mathematical gnostics will be introduced to demonstrate the power of critical data assessment in generating new datasets.