

# Transport Properties of LiTFSI-Acetamide Room Temperature Molten Salt Electrolytes Applied in an Li-Ion Battery

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In the present work some transport properties of the binary room temperature molten salt (RTMS) lithium bis(trifluoromethane sulfone)imide (LiTFSI)-acetamide [LiN(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>-CH<sub>3</sub>CONH<sub>2</sub>], applied in an Li-ion battery, have been investigated. The phase diagram was determined by differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA). The result reveals that the binary RTMS has an eutectic point at 201 K and the 30 mol% LiTFSI composition. The electric conductivity was measured using a direct current computerized method. The result shows that the conductivities of the melts increase with increasing temperature and acetamide content. The densities of all melts decrease with increasing temperature and acetamide content. The equivalent conductivities were fitted by the Arrhenius equation, where the activation energies were 18.15, 18.52, 20.35, 25.08 kJ/mol for 10, 20, 30, 40 mol% LiTFSI, respectively. Besides the relationships between conductivity, density composition and temperature, of the ion interaction is discussed.

*Key words:* Room Temperature Molten Salt; Phase Diagram; Conductivity; Density; LiTFSI-Acetamide.