

# Molten salts examples

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The purpose of this chapter is to present an overview of the physico-chemical properties of high temperature molten salts. The topics addressed include: an overview of molten salts, i.e., their main characteristics, their advantages and drawbacks compared with aqueous electrolytes, and the industrial processes involving molten salts, the main physicochemical properties including the transport properties. Finally, the electrochemical properties of molten salts and transient methods for the study of electrode mechanisms are described.

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## Policies and ethics

Despite the fact that the most important industrial applications of molten salts have started at the beginning of the twentieth century with the large-scale production of aluminum, their structure has long remained largely unknown. Most of the short-range structural properties can be attributed to the competition between packing effects and electrostatic...

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## Policies and ethics

Molten salts conduct electricity the same way they do when they are dissolved in water; some of the salt molecules are dissociated into ions, which allows the ions to conduct electricity. The "Downs Cell" capitalizes on this conduction of electricity to produce virtually all of the metallic sodium required by industry. Electricity is run through molten sodium chloride (with a little calcium chloride salt added to lower the melting point of the sodium chloride). At one terminal chlorine gas is released (the anode) and at the other (the cathode) liquid sodium.

Molten salt technology is a catch-all phrase that include somevery diverse technologies; electro-chemistry, heat transfer, chemicaloxidation/reduction baths, and nuclear reactors. All of thesetechnologies are linked by the general characteristics of moltensalts:

Molten salts have been used in many industries as a hightemperature heat transfer medium. The "highest profile" use of moltensalts in this regard is the Solar Power Tower near Dagget, California(excuse the pun). It uses a Sodium Nitrite/Nitrate mixture to absorband store the sun's heat from the focus of many mirrors in the desertupon a central tower. The heat from the salt is then transfered via aheat exchanger to produce steam to drive a conventional steam turbineand generator to produce electricity from the sun for SouthernCalifornia.3a

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Molten salts are also used in Fuel Cells. While there are many different types currently being researched, the usual characteristic is to employ a mixture of various salt carbonates (e.g.,  $\text{Na}_2\text{CO}_3$ , sodium carbonate & other carbonates of lithium, potassium, etc.) as the electrolyte of a battery called a fuel cell. The advantage of this type of fuel cell is its ability to use carbon-containing fuels (methanol, gasoline, etc.) directly in the production of electricity. The disadvantage is that these molten salts corrode metal very easily. Lifetimes of the electrodes is still a problem area.

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