Liquid Salts: A Brief Introduction

by Keith E. Johnson and Charles L. Hussey

Highlights of molten salt electrochemistry in the 19th century were the preparation of potassium, the basic work of Faraday, and the development of the aluminum industry. Between the two World Wars, considerable fundamental work took place in Germany; and in the second half of the 20th century, molten salt chemistry research flourished in the United States, the United Kingdom, and the Soviet Union in particular. Long-standing processes, such as the blast furnace production of iron, were examined from a more theoretical viewpoint; and efforts to prepare a wide variety of reactive metals or handling spent nuclear fuels through the use of liquid salts were attempted. It was accepted that the vast majority of liquid inorganic salts were well, if not fully, ionized.

Metallic salts of organic acids and organic salts of simple and complex halides received intermittent attention until the 1970s and 1980s, when the possibilities of developing an efficient low-temperature aluminum battery and using these salts as solvents or reactants for organic chemistry were examined. The fact that many of these salts have low vapor pressures makes them attractive alternatives to volatile molecular organic liquids as an awareness of the environmental consequences of uncontrolled distribution of chemical materials increases. These organic and semi-organic salts also tend to be ionized to a reasonable degree and so the term "ionic liquids" was attached to them. It turns out, however, that this term had already been applied more generally; nevertheless one might say that it has "stuck"!

In this issue of *Interface*, we present three articles which we hope are of interest to the molten salt community, electrochemists, and those curious about the nature of ionic liquids in general and what sort of things they are and for what purposes they could be useful. The first article compares the old and the new; the second discusses electrochemistry in room temperature systems; and the third illustrates the scope of these systems for organic and organometallic chemistry. We trust it helps the readers to put these versatile materials in a realistic perspective. ■

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