

# Improvements on Molten Salt Electrolytic Processes for Production of Magnesium and Sodium Metal

V. Ananth\* and T. Selvin Devasahayam\*\*

## Abstract

The paper describes the studies that are being carried out on the improvement on the electrolytic cells for production of magnesium and sodium metal. Modular and bipolar processes were developed for the production of magnesium metal. These processes had the problem of lean chlorine through the exhaust and disturbing atmosphere in the cell house for operators. Multiple monopolar cell with plate electrodes were introduced along with liquid seal in between the electrolyzing and metal collecting compartments. This arrangement also minimized the recombination reaction between magnesium metal and chlorine. The cells were operated around 700 °C. The current efficiencies obtained in these cells were in the order of 80% while they were 65 to 70% for the earlier cells.

During 1970s, CECRI had developed a technology for production of sodium metal based on Down's cell and handed it over to a company in Gujarat. Frequent failure of the metallic mesh diaphragm the normal complaint from these type cells. The problem was analysed and planned to do away with the diaphragm. It was decided to introduce central tubular cathode with holes at its bottom to channelise the molten electrolyte and the sodium metal getting discharged over its surface. The idea was tested on a laboratory cell of 20 A capacity and implemented on a 100 A cell. The study was conducted using 33 wt% Sodium chloride and 66 wt% Calcium chloride at 650 °C. The initial observations are encouraging and are presented in this paper.