

## **Production of carbon via Electrochemical conversion of CO<sub>2</sub> in carbonate based Molten Salt**

### **Abstract**

Carbon was successfully deposited on AISI 304 stainless steel rod cathode through electrolysis process in three molten salt mixtures, namely K<sub>2</sub>CO<sub>3</sub>-Li<sub>2</sub>CO<sub>3</sub> (mole ratio: 1:1), CaCO<sub>3</sub>-Li<sub>2</sub>CO<sub>3</sub>-LiCl (mole ratio 0.09:0.28:0.63) and CaCO<sub>3</sub>-CaCl<sub>2</sub>-KCl-LiCl (mole ratio: 0.13:0.31:0.10:0.45), under CO<sub>2</sub> atmospheres as continuous source of carbon. The process were carried out for 1 hour at temperature range 545–585°C and electrolysis voltage of 4.0V to drive the deposition of carbon through electrochemical conversion. EDX analysis on deposited products shown carbon as dominant element (89-98%). SEM revealed carbon with Flakes and grapes aggregation shapes for different salt mixtures. The achieved current efficiency of 83.8%, 80.46% and 92.41% were found in the respective salt mixtures, and energy consumption promotes several ways for efficiency improvement on the electrochemical conversion of CO<sub>2</sub>.