

## ABSTRACT

Iron metal was investigated for use as a consumable anode for electrolytic reduction of solid metal oxides in molten LiCl-Li<sub>2</sub>O (2.0 - 2.4 wt%). Tests were performed where the potential of Fe anodes was increased incrementally from 0.1 to 1.0 V (vs Ni/NiO). Oxide formation on the anode started at a potential of 0.4 V and was identified as FeO via X-ray diffraction. In the absence of a pre-formed oxide layer, severe attack of the anode started at a potential of 0.7 V and was accompanied by an increase in Fe concentration in the salt. When an oxide layer was allowed to form on the anode, the Fe concentration did not increase in the salt. O<sub>2</sub> was detected in the headspace gas at an anode potential of 1.0 V only when an oxide layer was present on the anode. The results of this study support the idea that an inexpensive sacrificial anode could be an ideal replacement for expensive Pt that is currently widely used for this process.