Short Communication

Pulsed Current electrodeposition of manganese in NaCl-KCl-MnCl₂ melt

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doi: 10.20964/2019.06.31

Received: 25 February 2019 / Accepted: 2 April 2019 / Published: 10 May 2019

Pulsed current electrolysis was applied in NaCl-KCl-MnCl₂ melt at 983 K to enhance morphology of cathode product. A tungsten wire was used as the working electrode, a carbon rod was employed as the counter electrode and Ag/AgCl was used as the reference electrode. The electrochemical reduction of Mn²⁺ was investigated in this three-electrode cell. Then tungsten wire and carbon rod were used as the cathode and anode to establish a two-electrode cell. Under pulsed current electrolysis, the influence of various pulsed parameters (e.g., periodic time (t) and the ratio of t_{on} to t_{off} (n)) on the morphology of cathode product was explored. It was found that comparing with that of direct current electrolysis, when t=10 min, n=1, the produced manganese with coarser grain was obtained. In addition, high carbon ferromanganese was used as the anode, with a tungsten plate as the cathode to perform pulsed current electrorefining. It was also concluded that when t=10 min, n=1, the morphology of produced manganese and iron was obviously improved, with large grain obtained.

Keywords: high carbon ferromanganese, manganese, pulsed current electrolysis, molten salt

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