Ti production by the FFC Cambridge process

S.C. Heck[1], M.F. de Oliveira[1]
[1] *Universidade de São Paulo, São Carlos, SP, Brazil*

Titanium and its alloys have excellent corrosion, tribological and mechanical properties but their use is limited mainly due to titanium expensive extraction process [1]. Recently a novel process for obtaining Ti and other metals has been highlighted, the FFC process. It is an electrochemical process in which the metal oxide is polarized against a graphite electrode in molten salt. Titanium dioxide is used as the solid cathode and graphite as the anode in the high-temperature FFC cell in which molten calcium chloride (melting point 762^{o}C) is used as the electrolyte. During electrolysis in the solid TiO_2 is converted in lower valence oxides and eventually to Ti metal. Due to the applied electric potential the oxygen ions leave the cathode and move towards the graphite anode through the molten electrolyte. These ions discharge at the graphite anode forming carbon monoxide or carbon dioxide[2]. The current study describes the Ti production by the FFC process. Titanium dioxide pellets were successful reduced to Ti. The process efficiency (oxygen content reduction) was greatly influenced by process parameters like temperature, cell potential and the anode type (reactive or inert).

Keywords: Titanium, electro-deoxidation, FFC Cambridge process.

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stenioheck@gmail.com– EESC, USP, CEP 13566-590, São Carlos, SP, Brazil