Transformation of the Three-Phase Interlines During the Electrochemical Deoxidation of TiO₂

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The deoxidation of TiO₂ cathode in molten CaCl₂ was studied at 900 °C and under 3.2 V for different time periods. Materials were characterized before and after electrolysis by scanning electron microscopy, X-ray energy dispersive spectroscopy, and X-ray diffraction. The results show that the deoxidation process invariably proceeded through several intermediate species and can be described as four steps. The formation of the interfaces, especially the three-phase interlines (3PI) between the formed intermediate species and its subsequent transformation during the deoxidation process, are discussed. These findings are compared to the previous typical 3PI model.

Keywords: three-phase interline, electrochemical deoxidation, titanium dioxide, calcium chloride

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