

SUMMARY

Electrochemical characteristics of titanium-manganese dioxide electrodes
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Explanatory note: 102 p., Figs .15, 8 Tables, 70 references.

Titanium-manganese dioxide electrodes (TMDE) is a component of resource-saving technologies. They are labor intensive and resource-intensive production, which is the source of emissions NO_2 , H_2S and wastewater. The electrochemical characteristics of TMDE were analysed and it was linked these characteristics with features manufacturing technology. The feasibility of simplification was showed. It was offer to refuse digestion Ti-base in H_2SO_4 , because it is a source of H_2S emissions and wastewater. This is because the transition resistance on the verge of Ti/MnO_2 for TMDE manufactured with pyrolytic method and the traditional simplified technology equalized after 30 $\text{kA}\cdot\text{h}/\text{m}^2$. Moreover, TMDE, which made with no digestion, show further decline slowly transition resistance. It was found the reasons that made it impossible for applying one layer of MnO_2 (traditionally put ten or more thin layers). This reason - boiling of water that loses $\text{Mn}(\text{NO}_3)_2\cdot 6\text{H}_2\text{O}$ already at 100°C , including due to the formation of embryos MnO_2 . At the first time was offer to slow boiling process that removes germs from MnO_2 from titanium base. A powder composition (75% satenhyps and 25% cement) should be contribute to the solution of $\text{Mn}(\text{NO}_3)_2$ in an amount of 1%. This compound captures vacant water from $\text{Mn}(\text{NO}_3)_2\cdot 6\text{H}_2\text{O}$ directly at the place of formation of embryos MnO_2 . At the interface of Ti / MnO_2 contained non-conductive inorganic composition, which increases the transition resistance. It was proposed to introduction 30% graphite powder to compensate this effect. It was found that the transition resistance on the verge Ti/MnO_2 increases draining of current into the solution. This comes directly from a titanium base, and not with crystal MnO_2 . In order to prevent the rapid growth of transition resistance on the interface Ti/MnO_2 during the operation TDMA it was proposed to apply MnO_2 in two layers. The first layer containing 10% powder PTFE except the above-named composition. The presence of PTFE at the interface of Ti/MnO_2 create hydrophobic areas. They are in contact with MnO_2 , but not in contact with the solution. As a result, cells remain for a long time for percolation of those current base in the catalyst lawyer.

Keywords: TITANIUM-MANGANESE DIOXIDE ANODE, ELECTROCHEMICAL CHARACTERISTICS, STABILIZATION OF TRANSITION RESISTANCE, SIMPLIFICATION OF MANUFACTURING TECHNOLOGY, RESOURCE.