Electrochemical properties of titanium-based catalytically active electrodes in perchloric acid

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The electrochemical behavior of the electrodes made of titanium powders and catalytically active materials based on titanium in solutions of perchloric acid is studied by the voltammetry methods. The influence of preliminary preparation of titanium on its electrochemical behavior is investigated with an aim to develop new modes of treatment of titanium used as the base material for the gas-diffusion electrodes of electrochemical sensors. It is shown that, titanium may play the role of conductive base for catalytically active materials in HClO4 solutions within the potential range 0.5–1.7 V. The accumulated results show that there exists a range of values of the working potentials of titanium-based electrodes attained in air within which the analyzed components can be detected with high resolution. Depending on the nature of catalytically active materials, the range of working potential lies between 100 mV for the Ti/MnO2 electrode and almost 400 mV for the Ti/Pt electrode inside the range of values of the stationary currentless potential of the working electrode determined in air.

Keywords

electrochemical sensorsmonitoring of airmatrix electrolyteperchloric acidtitaniumoxidationcatalytically active electrode.