Electrocatalytic properties of Ti/Pt–IrO2 anode for oxygen evolution in PEM water electrolysis

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A novel Pt–IrO2 electrocatalyst was prepared using the dip-coating/calcinations method on titanium substrates. Titanium electrodes coated with oxides were investigated for oxygen evolution. Experimental results showed that Ti/Pt–IrO2 electrode containing 30mol% Pt in the coating exhibited significantly higher electrocatalytic activity for oxygen evolution compared to Ti/IrO2 prepared by the same method, which is also supported by the electrochemical impedance data. Stability tests demonstrated Pt–IrO2 electrocatalyst had a service cycle of 10,000 times in 0.1M H2SO4 solution. And the anode surface had hardly discovered cracks and had compact structures, which contributed to stable nature of the electrode together with good conductivity and specific interaction between Pt and IrO2 formed during the calcination. Furthermore, the enhanced catalytic activity for O2 evolution at Ti/Pt–IrO2 electrode is preliminarily discussed using the Mott–Schottky analysis.

**General information**

State: Published
Organisations: Energy and Materials, Department of Chemistry, University of Science and Technology of China
Contributors: Ye, F., Li, J., Wang, X., Wang, T., Li, S., Wei, H., Li, Q., Christensen, E.
Pages: 8049-8055
Publication date: 2010
Peer-reviewed: Yes

**Publication information**

Volume: 35
Issue number: 15
ISSN (Print): 0360-3199
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 4.1 SJR 1.116 SNIP 1.267
Web of Science (2017): Impact factor 4.229
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.74 SJR 1.145 SNIP 1.315
Web of Science (2016): Impact factor 3.582
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 3.46 SJR 1.27 SNIP 1.314
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 3.54 SJR 1.207 SNIP 1.484
Web of Science (2014): Impact factor 3.313
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 3.38 SJR 1.265 SNIP 1.449
Web of Science (2013): Impact factor 2.93
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 3.96 SJR 1.499 SNIP 1.708
Web of Science (2012): Impact factor 3.548
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): CiteScore 4.42 SJR 1.443 SNIP 1.828
Web of Science (2011): Impact factor 4.054
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.579 SNIP 1.854
Web of Science (2010): Impact factor 4.057
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.32 SNIP 1.87
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.389 SNIP 2.073
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.266 SNIP 2.197
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.061 SNIP 2.202
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.116 SNIP 1.825
Scopus rating (2004): SJR 1.232 SNIP 1.626
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.996 SNIP 1.289
Scopus rating (2002): SJR 0.748 SNIP 1.156
Scopus rating (2001): SJR 0.488 SNIP 1.197
Scopus rating (2000): SJR 0.384 SNIP 0.83
Scopus rating (1999): SJR 0.376 SNIP 0.882
Original language: English
Keywords: Pt–IrO2, Oxygen evolution reaction, Water electrolysis, Catalytic activity
DOIs:
10.1016/j.ijhydene.2010.01.094
Source: orbit
Source-ID: 272217
Research output: Research - peer-review › Journal article – Annual report year: 2010