

ICS 27.070
CCS K 82



中华人民共和国国家标准
NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 20042.5-2024
Replaces GB/T 20042.5-2009

Proton Exchange Membrane Fuel Cell
—Part 5: Test Method for Membrane Electrode Assembly
质子交换膜燃料电池
第 5 部分：膜电极测试方法
(English Translation)

Issued on 2024-12-31

Implemented on 2025-07-01

Jointly Issued by
State Administration for Market Regulation of the People's Republic of China &
Standardization Administration of the People's Republic of China

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Proton Exchange Membrane Fuel Cell

—Part 5: Test Method for Membrane Electrode Assembly

1 SCOPE

This document describes the test methods for membrane electrode assembly (MEA) of proton exchange membrane fuel cell (PEMFC), i.e., thickness uniformity test, Pt group metal loading test, polarization curve test, hydrogen crossover current density test and insulation resistance test, electrochemical active surface area test, oxygen reduction reaction (ORR) activity test, ohmic polarization test, MEA aging tests, anode hydrogen oxidation reaction (HOR) polarization test, MEA anode anti-voltage reversal test, gaseous contaminants withstand test and MEA durability test.

This document is applicable to testing the MEA of the PEMFC, while this document may be used as a reference for other polymer electrolyte fuel cells.

2 NORMATIVE REFERENCES

The following normative documents contain provisions which, through normative reference in this text, constitute essential provision of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendment) applies.

GB 3095-2012	Ambient air quality standard
GB/T 6682-2008	Water for analytical laboratory use - Specification and test methods
GB/T 8979	Pure nitrogen and high purity nitrogen and ultra-pure nitrogen
GB/T 14599	Pure oxygen and high purity oxygen and ultra-pure oxygen
GB/T 20042.1-2017	Proton Exchange Membrane Fuel Cell - Part 1: Terminology
GB/T 28816-2020	Fuel cell—Terminology
GB/T 28817-2022	Single cell test methods for polymer electrolyte fuel cell (PEFC)
GB/T 31886.1-2015	Test method about the influence of gaseous contaminant(s) in reaction gas on the performance of proton exchange membrane fuel cells—Part 1: Gaseous contaminant(s) in air
GB/T 31886.2-2015	Test method about the influence of gaseous contaminant(s) in reaction gas on the performance of proton exchange membrane fuel cells—Part 2: Gaseous contaminant(s) in hydrogen
GB/T 34872-2017	Technical requirement of hydrogen supply system for proton exchange membrane fuel cells
GB/T 37244-2018	Fuel specification for proton exchange membrane fuel cell vehicles—Hydrogen

3 TERMS AND DEFINITIONS

For the purposes of this document, the terms and definitions given in GB/T 20042.1-2017 and GB/T 28816-2020, as well as the following apply.

3.1 Pt group metal loading

mass of platinum group metals incorporated in the fuel cell (electrode) per unit active area

Note 1: either per anode or cathode Pt group metal loading separately, or combined anode and cathode Pt group metal loading.

Note 2: Pt group metals include platinum (Pt), palladium (Pd), osmium (Os), iridium (Ir), ruthenium (Ru) and rhodium (Rh), etc.

3.2 electrochemical active surface area (ECSA)



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