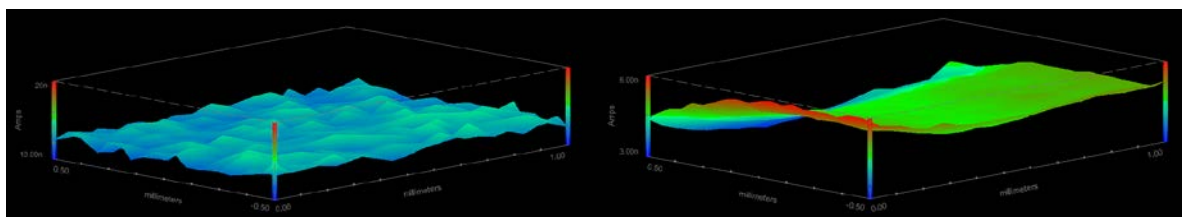
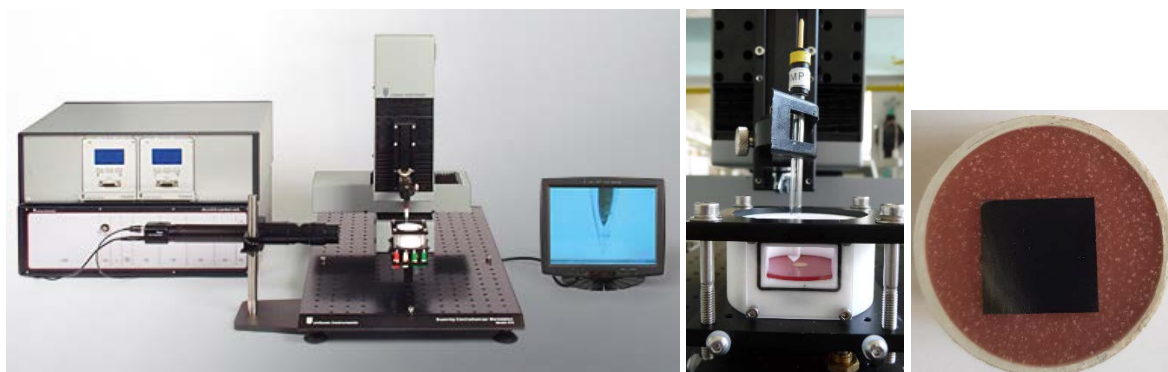
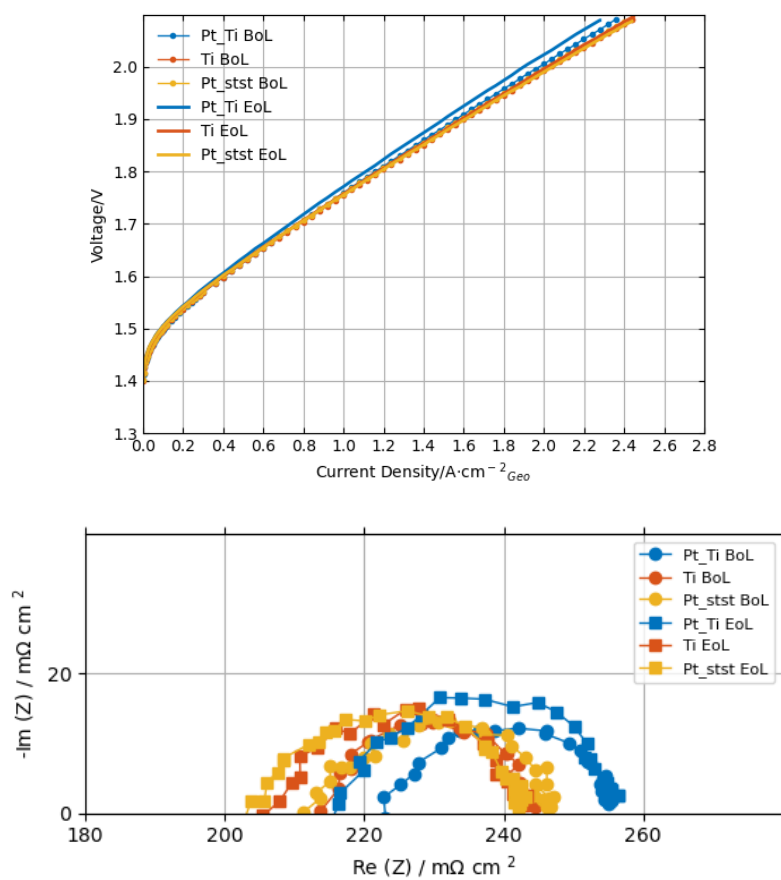


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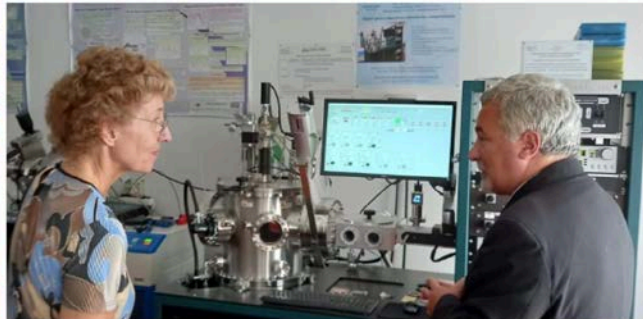
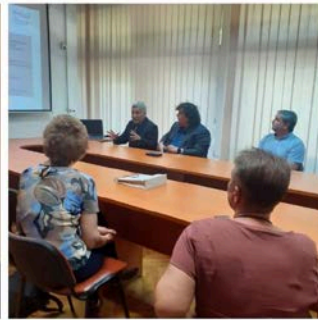
Stand pentru caracterizarea prin microscopie electrochimică cu baleiaj și rezultatul unei scanări a suprafeței unui oțel inoxidabil ferritic utilizat în cadrul proiectului CoDe-PEM




Rezultate ale experimentelor galvanostatice la 70°C pentru plăci bipolare din Ti, Ti acoperit cu un strat de Pt, respectiv oțel inoxidabil acoperit cu un strat de Pt/Ti



Activități tip Open Day organizate în Universitatea Politehnică Timișoara în cadrul proiectului CoDe-PEM




Vizita de monitorizare a proiectului din partea unei delegații a Ambasadei Norvegiei la București, condusă de Excelența Sa Doamna Ambasador Siri Barry.



WHEC-2022
Water Hydrogen Electrolysis Conference

AISI 442 and 446 Ferritic Stainless Steel as a Support for Bipolar Plates #127 in Proton Exchange Membrane Water Electrolyzers



CoDe-PEM
Coated Diaphragm Electrolyzer

INTRODUCTION

Proton Exchange Membrane Water Electrolysis (PEMWE) is widely used to store hydrogen gas from renewable energy. As the demand for hydrogen as a fuel grows, larger scale electrolyzers are needed. The CoDe-PEM Electrolyzer for Proton Exchange Membrane Water Electrolysis (CoDe-PEMWE) is a novel design of a bipolar plate (BP) for PEMWE. The BP is made of AISI 442 and AISI 446 ferritic stainless steel. The BP is coated with a thin layer of Pt/C. The BP is used as a support for the PEM and the catalyst. The BP is made of AISI 442 and AISI 446 ferritic stainless steel. The BP is coated with a thin layer of Pt/C. The BP is used as a support for the PEM and the catalyst.

MATERIALS AND METHODS

The electrochemical properties of the AISI 442 and AISI 446 were investigated in 0.5 M H₂SO₄ at 100 °C. The electrochemical impedance spectroscopy (EIS) was used to study the electrochemical properties of the AISI 442 and AISI 446. The Tafel plots were used to study the electrochemical properties of the AISI 442 and AISI 446. The current densities were calculated using the Tafel plots. The Tafel plots were used to study the electrochemical properties of the AISI 442 and AISI 446. The current densities were calculated using the Tafel plots.

RESULTS AND DISCUSSION

Figure 1. Tafel plots

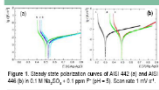


Table 1. Tafel slopes

| Sample | β (mV/dec) |
|----------|------------------|
| AISI 442 | 115 |
| AISI 446 | 110 |

Table 2. Electrochemical parameters

| Sample | i_0 (A/cm²) | η (mV) | R_{ct} (Ω) |
|----------|---------------|-------------|--------------|
| AISI 442 | 0.15 | 115 | 1.5 |
| AISI 446 | 0.25 | 110 | 1.2 |

Figure 2. EIS Nyquist plots




Table 3. Electrochemical parameters from EIS

| Sample | R_{ct} (Ω) | τ (s) |
|----------|--------------|------------|
| AISI 442 | 1.5 | 0.1 |
| AISI 446 | 1.2 | 0.08 |

Figure 3. SEM images

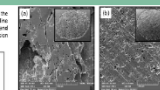
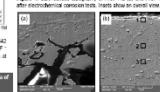


Figure 4. XPS spectra



OBJECTIVES

The work presents the results obtained in the study of the electrochemical properties of AISI 442 and AISI 446. The objective of the work is to study the electrochemical properties of AISI 442 and AISI 446. The objective of the work is to study the electrochemical properties of AISI 442 and AISI 446.


CONCLUSIONS

The electrochemical properties of AISI 442 and AISI 446 were investigated. The results show that AISI 446 has better electrochemical properties than AISI 442. The results show that AISI 446 has better electrochemical properties than AISI 442.


ACKNOWLEDGEMENT

The authors would like to thank the funding agencies for their support. The authors would like to thank the funding agencies for their support.


CONFERENCE PROGRAM



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Rezultatele proiectului prezentate la Conferința WHEC – June 2022, Istanbul