



Contribution ID: 578

Type: **Poster Presentation**

Effect of catalyst particle size distribution in the catalytic layer on the performance of water electrolysis in proton exchange membrane pore scale simulation

Monday, 13 May 2024 14:55 (1h 30m)

In this study, the effect of catalyst particle size on the performance of proton exchange membrane water electrolyzer (PEMWE) was studied by using the Lattice Boltzmann Method (LBM). The results show that compared with the catalyst particle distribution, the catalyst particle size is the main factor affecting the performance of the catalytic layer of the anode. Homogenized catalyst particles with smaller particle size can effectively increase the specific surface area of catalyst particles and increase the ECSA of the catalytic layer, thereby improving the electrochemical reaction performance of the catalytic layer. The electrochemical performance of the catalytic layer can be effectively improved by using catalyst particles with smaller particle size and more uniform distribution in the preparation of the catalytic layer (the average local reaction current is 0.13A/cm² at 3V)

This study investigates the effect of catalyst particle sizes on the performance of a PEMWE using the lattice Boltzmann method (LBM). The findings reveal that the size of catalyst particles plays a crucial role in determining the performance of the anode CL, surpassing the influence of catalyst particle size distribution. Utilizing smaller and more uniform catalyst particles enhances the specific surface area and electrochemical reaction performance of the CL.

Key words: PEMWE, LBM, Catalyst layer, Gaussian distribution

Acceptance of the Terms & Conditions

[Click here to agree](#)

Student Awards

Country

中国

Porous Media & Biology Focused Abstracts

This abstract is related to Porous Media & Biology

References

[1] Mohd Alam, Kuldeep Kumar, Saket Verma, Viresh Dutta, Renewable sources-based DC microgrid using hydrogen energy storage: Modelling and experimental analysis, Sustainable Energy Technologies and Assessments, Volume 42,2020,100840, ISSN 2213-1388,

Conference Proceedings

I am interested in having my paper published in the proceedings.

Primary author: HE, Jiabin (ChongQing University)

Presenter: HE, Jiabin (ChongQing University)

Session Classification: Poster

Track Classification: (MS04) Swelling and shrinking porous media