

Research Trends on Green Hydrogen Fuel Cell Utilization on Power System Using Bibliometric Analysis and Visualization Based on The Scopus Database in 1958-2022

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Abstract

The number of academic publications in the hydrogen field has been rapidly developing. Most published articles focus on a specific technical aspect, such as hydrogen production, hydrogen storage, electrolysis, oxidation, electrocatalysts, polyelectrolytes, electrochemistry, oxygen reduction reaction, and others with broader focus areas. Although many studies have been published on hydrogen fields, the lack of systematic publications regarding research trends in this subject needs to be better recognized. Bibliometrics analysis and visualization can synthesize the most recent research on a specific topic, define the quantitative development process, and compare research outcomes and dynamic evolution using bibliometric analysis and macro development perspectives. This study focuses on green hydrogen fuel cell utilization in power systems using bibliometric analysis and visualization through authors, sources, documents, conceptual structures, and social structure based on the Scopus database between 1958 and 2022. The author's analysis shows 6,984 authors, with Dincer as the most relevant author, 118 single-authored documents, and 24% international co-authorship. The sources analysis shows there are 789 sources, where the International Journal of Hydrogen Energy is the most relevant from 2002 with 36 H-index and 4,515 total citations, and 1995 is the highest average with 36 citations per year. The documents analysis shows there are 1990 documents with a 10% annual growth rate, which continues to increase. We also found that research keywords move to optimization and decarbonization. In conceptual structures analysis, we found niche themes related to silver nanoparticles, green synthesis, and microbial fuel cells and emerging themes related to hydrogen evolution reaction. The social structure analysis found three major collaboration networks with solid social networks and the country's collaboration networks. This work can help researchers and the scientific community comprehensively understand the study field's knowledge foundation more rapidly.