A scientometrics review of solar thermal energy storage (STES) during the past forty years

Ghalambaz, Mohammad[a]; Sheremet, Mikhail[a]; Fauzi, Muhammad Ashraf[b]; Fteiti, Mehdi[c]; Younis, Obai[d, e]

[a] Laboratory on Convective Heat and Mass Transfer, Tomsk State University, Tomsk, 634045, Russian Federation

[b] Faculty of Industrial Management, University Malaysia of Pahang (UMP), Gambang, 26300, Malaysia

[c] Physics Department, Faculty of Applied Science, Umm Al Qura University, Makkah, 24381, Saudi Arabia

[d] Department of Mechanical Engineering, College of Engineering in Wadi Addwasir, Prince Sattam Bin Abdulaziz University, Al-Kharj, 11942, Saudi Arabia

[e] Department of Mechanical Engineering, Faculty of Engineering, University of Khartoum, Sudan

ABSTRACT

The number of research articles on the issue of Solar Thermal Energy Storage STES has increased significantly in recent years due to the large potential of solar radiation in providing renewable and clean energy. The number of studies aiming to alleviate the intermittency character of solar radiation by storing solar thermal heat during daylight has amazingly increased. The present study is a scientometric investigation that aims to explore researchers on Solar Thermal Energy Storage STES during the past forty-one years. The scientometric analysis aims to provide the number of publications, citations, and dynamic mapping of the connections between authors, institutions, and countries in the STES domain. The method is based on the retrieval from the Web of Science database (WOS) of the bibliographic data published between 1982 and 2022. A total of 1835 items were collected on May 14th, 2022. The data have been analyzed using the VOSViewer Software to plot, visualize and map dynamic network connections between authors, institutions, and countries. The results showed that Cabeza (Current affiliation Universitat De Lleida in Spain) is the most productive author with 47 publications, 2954 total citations, an H-index of 26, and the highest TC/TP ratio, equal to 62.9. The Universitat De Lleida in Spain was ranked in the first place as the best influential and productive institution with a TP = 59 and TC/TP index equal to 59. The five top productive and influential nations are China, the USA, India, Spain, and Germany, with total publications of 1129 and contributing by 50 % to the total publications. Analysis of keywords shows China and India focused on researching “Phase Change Materials,” whereas the USA and Spain have focused on “Concentrated Solar Power” with some attention to “Molten Salt.” France has a comparable emphasis as the USA but pays less attention to “Molten Salt,” whereas Australia emphasizes all three terms.

KEYWORDS

Bibliometric analysis; Energy storage; Scientometrics investigation; Solar thermal

ACKNOWLEDGEMENTS

The authors would like to thank the Deanship of Scientific Research at Umm Al-Qura University for supporting this work by Grant Code: (23UQU4310414DSR002). The study of Mikhail Sheremet and Mohammad Ghalambaz was supported by the Tomsk State University Development Programme (Priority-2030).