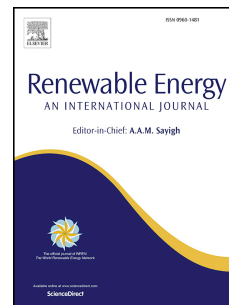


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1. Improvement on the Design and Fabrication of Planar SOFCs with Anode-Supported Cells Based on Modified Button Cells

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7. Abstract

8. In this study, a planar solid oxide fuel cells (SOFCs) apparatus with a 6 cm × 6 cm anode
9. supported single cell based on a modified button cell was designed for operation in both
10. regular cell and button cell configurations. The apparatus was assembled with a regular cell
11. with an active area of 5 cm × 5 cm and with a button cell with an active area of 2.54 cm².
12. They consist of fuel and oxidant chambers that allow heat conversion and thus increase the
13. temperatures of the fuel inlet and oxidant inlet streams. The chambers reduced the cooling
14. effect, thereby improved the cell performance. In addition, a wire-in-tube-type heat
15. exchanger was designed and fabricated. This device was installed in front of the fuel inlet
16. of the SOFC apparatus to improve heat transfer to better increase the temperature of the
17. fuel inlet stream. Results indicate that the fuel outlet temperature of the system with heat
18. exchanger is much higher than that of the system without heat exchanger. Thus, the
19. performance of system with heat exchanger is largely improved. This improvement means
20. that the wire-in-tube type heat exchanger is proved to be effectively increases the
21. hydrogen inlet temperature by enhancing heat transfer.

22. **Keywords:** Anode-supported cell, Solid oxide fuel cell (SOFC), Planar SOFC, Button cell,
23. Cooling effect, Heat exchanger.

24. 1. Introduction

25. Solid oxide fuel cells (SOFCs) are generally regarded as a promising alternative technology
26. to traditional power sources. They are an emerging technology for clean, reliable, and
27. flexible power production. Advantages of power production using SOFCs are the
28. cells' high conversion efficiency, the absence of combustion, and fuel flexibility, which
29. allows use of various fuels, including those derived from renewable sources. SOFC are

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